Appendix

Level Generator PS-30

Frequency Range; Unbalanced 50Hz to 1.62MHz
Balanced 50Hz to 620kHz

LEVEL GENERATOR PS-30
Frequency Range 50Hz to 1.62MHz

Appendix . . . . . .BN 4501/00.87

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PRECISION ELECTRONIC
MEASURING INSTRUMENTS

Series Status of the Diagrams forming the Appendix to the Service Manual for the PS-30

All circuit and component layout diagrams are applicable to instruments of Series C.

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INTRODUCTION TO APPENDIX

This Appendix has been produced as a separate publication to provide the service technician with essential information on the construction and circuitry of the instrument. Further servicing and permitted adjustment information is available in the Service Manual which may be obtained from your local W & G agent.

When used with the Service Manual, this Appendix may be conveniently opened at the page required and a circuit or other diagram may be referred to in conjunction with the text of the Service Manual.

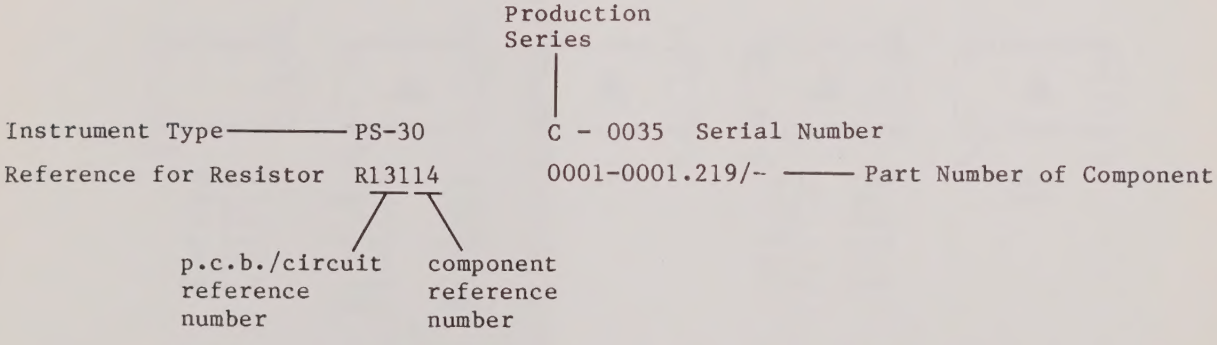
On the following pages will be found full circuit information for the PS-30 Level Generator, together with component layout diagrams and parts lists for all the units and sub-assemblies incorporated in a complete instrument.

Component Identification

Users of this Appendix are reminded of the information regarding the identification of components which may be found in Section 6.2.1 of the Service Manual.

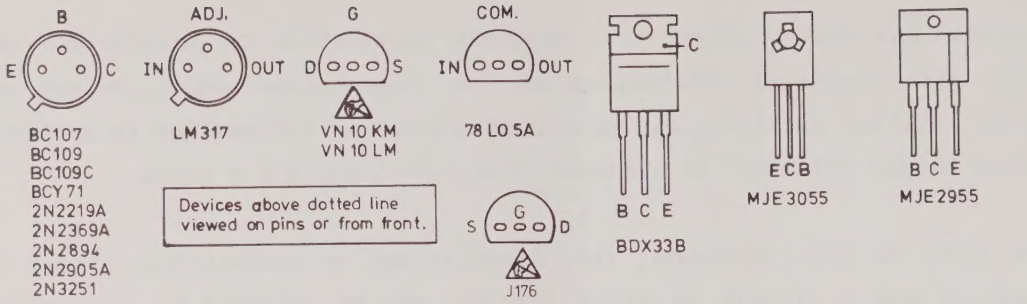
Ordering Information

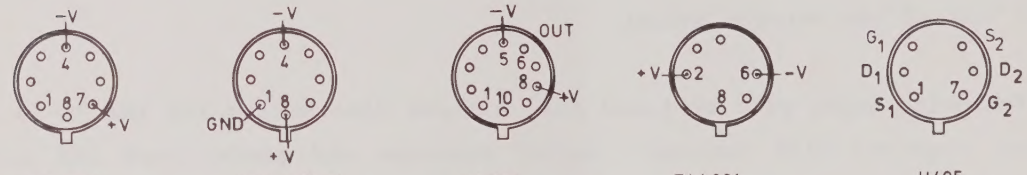
When ordering spare parts it is essential to quote the type of instrument and production series, together with the serial number as well as the circuit reference and part number of the particular component required, for example:

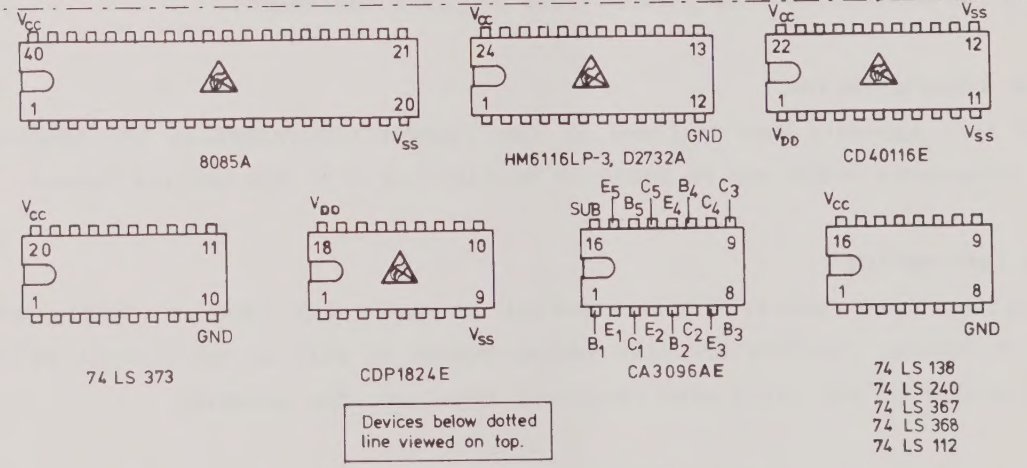


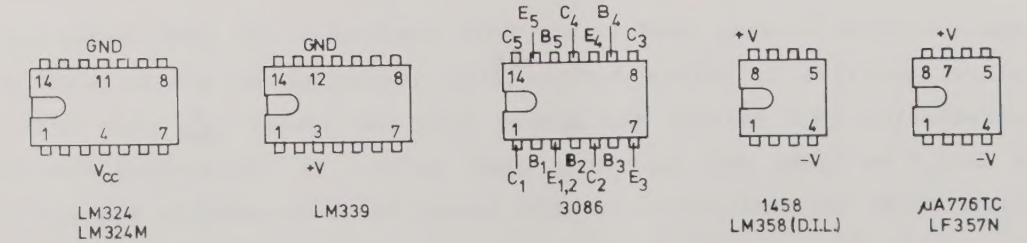
Electrostatic Sensitive Devices

Certain semiconductor devices used within this instrument use CMOS technology and are therefore sensitive to pulses derived from discharges of static electricity. Units incorporating CMOS devices are marked with the symbol: thus indicating that care should be taken when servicing these units. In the diagram showing the pin arrangements of the semiconductors this symbol has been added to the particular devices for which this warning applies. See Section 6.1.5 in the Service Manual for information regarding the handling of these devices.









Pin arrangements of Semi-conductor Devices used in PS-30

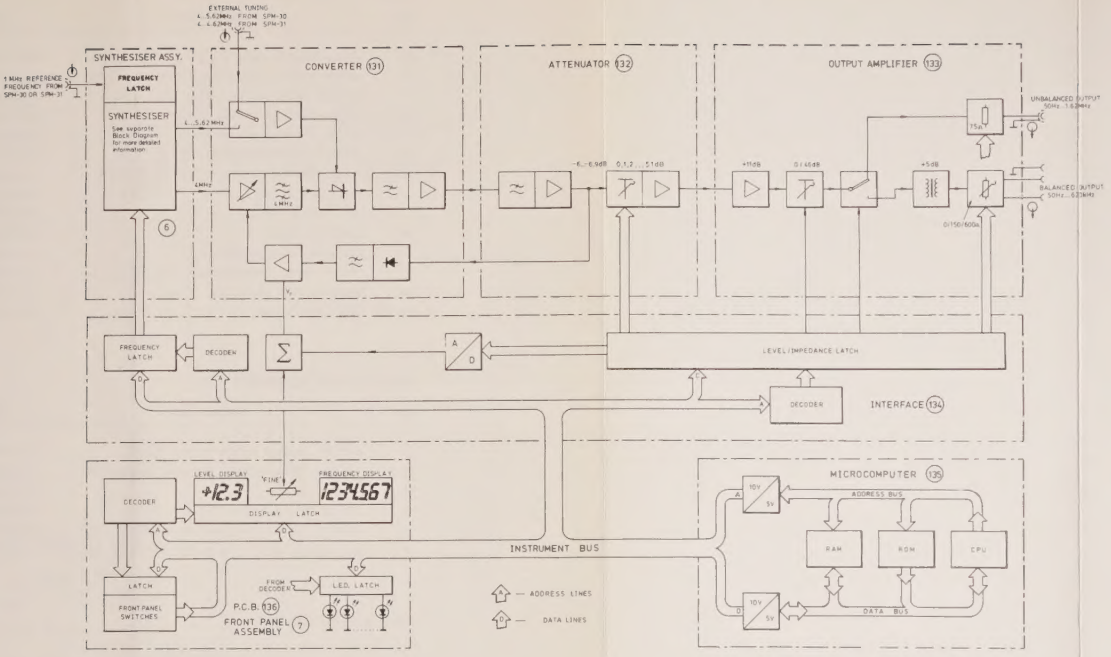


Fig. 1
Block Diagram of Complete Instrument

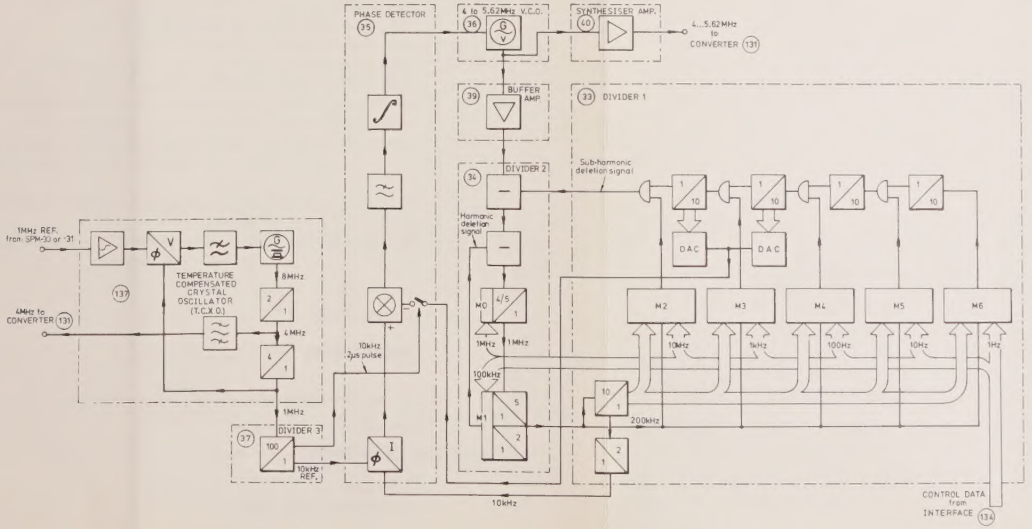


Fig. 2
Block Diagram of Synthesiser Assembly

Key to Component Type Abbreviations

(Used on the Parts Lists throughout this Appendix)

MF	Metal Film
Tant.	Tantalum
Cer.	Ceramic
PE	Polyester
PF	Polystyrene Film
CF	Carbon Film
W/W	Wirewound
Elec.	Electrolytic
Var.	Variable
Al. Ox.	Aluminium Oxide

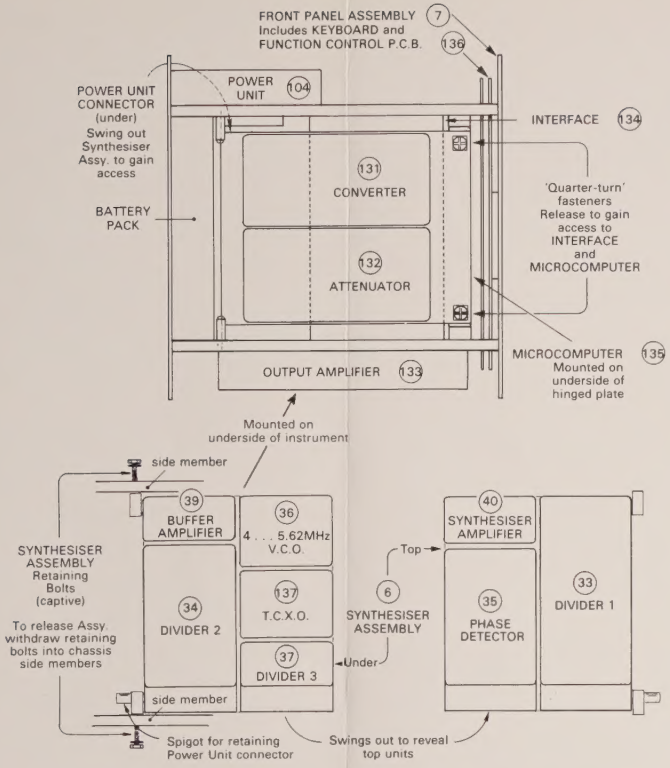

FRONT PANEL ASSEMBLY (7)
Includes KEYBOARD and FUNCTION CONTROL P.C.B. (136)
POWER UNIT CONNECTOR (under)
Swing out Synthesiser Assy. to gain access
POWER UNIT (104)
INTERFACE (134)
(131) CONVERTER
'Quarter-turn' fasteners Release to gain access to INTERFACE and MICROCOMPUTER
BATTERY PACK
(132) ATTENUATOR
MICROCOMPUTER (135) Mounted on underside of hinged plate
OUTPUT AMPLIFIER (133)
Mounted on underside of instrument
side member
(39) BUFFER AMPLIFIER
(36) 4 . . . 5.62MHz V.C.O.
SYNTHESISER ASSEMBLY Retaining Bolts (captive)
To release Assy. withdraw retaining bolts into chassis side members
(34) DIVIDER 2
(137) T.C.X.O.
(37) DIVIDER 3
side member
Spigot for retaining Power Unit connector
Top
(6) SYNTHESISER ASSEMBLY
Under
(40) SYNTHESISER AMPLIFIER
(35) PHASE DETECTOR
(33) DIVIDER 1
Swings out to reveal top units

Fig. 3 Location of Units within Instrument

COMPLETE UNIT ASSEMBLIES

REF.	DESCRIPTION	PART NO.	REF.	DESCRIPTION	PART NO.
A6	ASSEMBLY, SYNTHESISER COMPLETE	4501-1106.002/2	A40	ASSEMBLY, SYNTHESISER AMPLIFIER	4502-1040.004/3
	Includes A33, 34, 35, 36, 37, 39, 40 and 137		A104	ASSEMBLY, POWER UNIT	4502-1189.004/2
A7	ASSEMBLY, FRONT PANEL	4501-1107.009/2		Includes P.C.B. A84, POWER SUPPLY	4502-1084.002/3
A8	ASSEMBLY REAR PANEL	4501-1108.008/2	A131	ASSEMBLY, CONVERTER	4501-1031.007/3
A33	ASSEMBLY, DIVIDER 1	4502-1033.008/3	A132	ASSEMBLY, ATTENUATOR	4501-1032.006/3
A34	ASSEMBLY, DIVIDER 2	4502-1034.007/3	A133	ASSEMBLY, OUTPUT AMPLIFIER	4501-1033.005/2
A35	ASSEMBLY, PHASE DETECTOR	4502-1035.006/3	A134	ASSEMBLY, INTERFACE	4501-1034.004/2
A36	ASSEMBLY, 4...5.62MHz V.C.O.	4502-1036.005/3	A135	ASSEMBLY, MICROCOMPUTER	4501-1035.003/2
A37	ASSEMBLY, DIVIDER 3	4502-1037.004/3	A136	ASSEMBLY, KEYBOARD AND DISPLAY	4501-1036.002/2
A39	ASSEMBLY, BUFFER AMPLIFIER	4502-1039.002/3	A137	ASSEMBLY, T.C.X.O.	4501-1037.001/3

FRONT PANEL ASSEMBLY (7)

REF.	DESCRIPTION	PART NO.
S1	dB/dBm SWITCH, DPDT (1)	0001-7604.409/-
S2	ON/OFF SWITCH, ACTUATED BY PROTECTIVE COVER (A)	0001-0034.176/-
S3	BATTERY CHECK SWITCH (15)	0001-0034.176/-
S4	OFF/CHARGE/SEND SWITCH (16)	0001-0069.439/-
-	BUTTON FOR SWITCHES S2 AND S3	0000-3705.425/5
SK1	BALANCED OUTPUT CF SOCKET (8)	0000-3713.006/4
SK2	UNBALANCED OUTPUT BNC SOCKET (10),BODY	0000-2705.002/5
-	LOCKING RING FOR SK2	0000-1672.055/5
-	BNC ADAPTOR FOR SK2	0000-1674.008/5
SK3	EARTHING SOCKET	0000-3004.045/4
-	EARTHING SOCKET WASHER	4502-0230.006/4
RV1	'FINE' LEVEL POTENTIOMETER, 10kΩ (4)	0000-7545.270/-
D1	GREEN BATTERY CHECK LED	0000-7536.881/-
D2	RED MAINS ON LED	0001-0064.036/-

REAR PANEL ASSEMBLY (8)

REF.	DESCRIPTION	PART NO.
S1	BATTERY CHARGER ON/OFF SWITCH (21)	0001-7604.409/-
D1	DIODE, 1N4004, BATTERY REVERSAL PROTECTION	0000-7605.026/-
FS1	FUSE, T 1A	0001-0020.711/-
-	FUSEHOLDER (for above fuse)	0000-7602.236/-
-	RECEPTACLE, BATTERY NEGATIVE CONNECTOR	0000-7602.197/-
-	INSULATION 'BOOT', (cover for Connector above)	0000-7602.825/-

CABLE ASSEMBLIES

DESCRIPTION		PART NO.
COAX. CABLE ASSEMBLY	4-5.62MHz INPUT 22 TO CONVERTER	4501-1014.008/4
COAX. CABLE ASSEMBLY	1MHz INPUT 20 TO T.C.X.O.	4501-1015.007/4
COAX. CABLE ASSEMBLY	CONVERTER TO T.C.X.O.	4501-1016.006/4
COAX. CABLE ASSEMBLY	CONVERTER TO SYNTHESISER AMPLIFIER	4501-1017.021/4
COAX. CABLE ASSEMBLY	ATTENUATOR TO OUTPUT AMPLIFIER	4501-1017.018/4
RIBBON CABLE ASSEMBLY	14-WAY OUTPUT P.C.B. TO INTERFACE P.C.B.	4501-1018.017/4
RIBBON CABLE ASSEMBLY	ATTENUATOR P.C.B. TO INTERFACE P.C.B.	4501-1018.020/4
RIBBON CABLE ASSEMBLY	26-WAY INSTRUMENT BUS LINKING MICROCOMPUTER TO INTERFACE AND KEYBOARD AND DISPLAY P.C.B.'s	4501-1019.003/4
RIBBON CABLE ASSEMBLY	40-WAY CONNECTING SYNTHESISER TO INTERFACE P.C.B.	4501-1020.005/4
CABLE LOOM ASSEMBLY	CONNECTS POWER SUPPLY WITH INTERFACE P.C.B. AND FRONT PANEL ASSEMBLY	4501-1024.001/2

ACCESSORIES

DESCRIPTION	PART NO.
BATTERY PACK, BN 4502.00.02	4502-1186.007/2
FRONT DUST COVER	4502-1188.005/2
REAR DUST COVER	0960-0010.815/4
MAINS LEAD	0000-7605.453/-
BNC TERMINATED COAX. CABLE	0000-5059.933/-

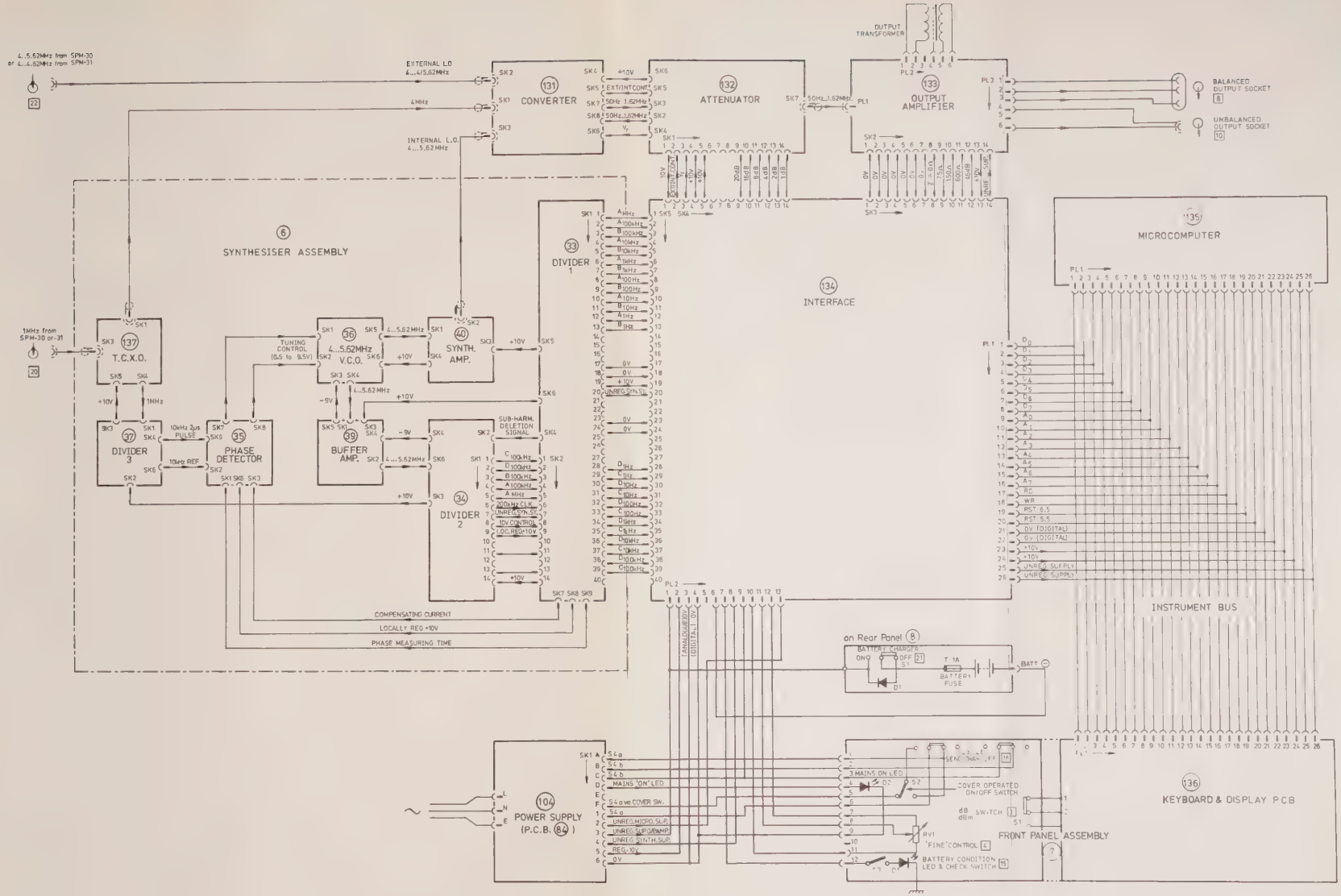
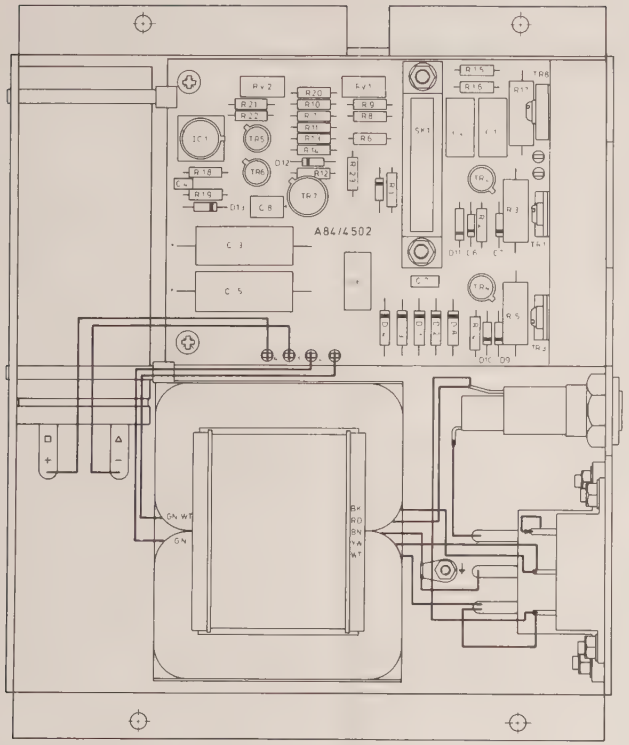
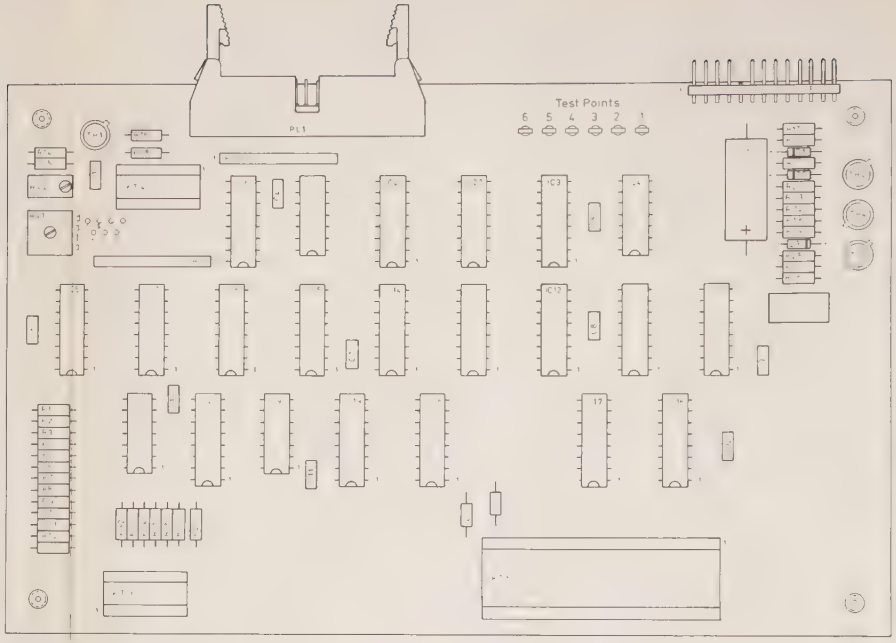


Fig. 4 Interconnection Diagram



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER eg
IC1 BECOMES IC8401
T1 — " — T10401

Fig. 5 Component Layout, Power Supply (104) (P.C.B. (84))



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER eg
IC1 BECOMES IC13401
R4 BECOMES R13404

Fig. 6 Component Layout, Interface (134)

ASSEMBLY A104 POWER SUPPLY

REF.	VALUE	TOL.± %	RATING	TYPE	PART NO.
C9	4700µ		40V		0000-7602.799/-
S1				SELECTOR SWITCH	
				115V/220V	0000-7598.706/-
T1				MAINS TRANSFORMER	4502-1308.005/4
PL1				PLUG, MAINS INPUT	0001-0033.245/-
FS1			250V	FUSELINK, T 315mA	0001-0020.601/-
			115V	FUSELINK, T 630mA	
FS2			Batt.	FUSELINK, T 1A	0001-0020.711/-
A84				P.C.B. POWER SUPPLY	
				UNIT	4502-1084.002/3

ASSEMBLY P.C.B. A84 used on A104 POWER SUPPLY

REF.	VALUE	TOL.± %	RATING	TYPE	PART NO.
R1	1k21	1	0W35	MF	0001-0001.277/-
R2	2k	1	0W35	MF	0001-0001.455/-
R3	3R9	5	1W6	W/W	0000-7601.583/-
R4	2k	1	0W35	MF	0001-0001.455/-
R5	3R3	5	1W6	W/W	0000-7601.570/-
R6	22k1	1	0W35	MF	0001-0002.441/-
R7	33k2	1	0W35	MF	0001-0002.603/-
R8	12k1	1	0W35	MF	0001-0002.218/-
R9	15k	1	0W35	MF	0001-0002.289/-
R10	182k	1	0W35	MF	0001-0003.165/-
R11	10k	1	0W35	MF	0001-0002.137/-
R12	4k75	1	0W35	MF	0001-0001.824/-
R13	3k92	1	0W35	MF	0001-0001.730/-
R14	10R	1	0W35	MF	0001-0000.074/-
R15	12k1	1	0W35	MF	0001-0002.218/-
R16	56R2	1	0W35	MF	0001-0000.346/-
R17	0R82	5	2W	W/W	0000-7601.596/-
R18	10R	1	0W35	MF	0001-0000.074/-
R19	1k82	1	0W35	MF	0001-0001.413/-
R20	1k54	1	0W35	MF	0001-0001.361/-
R21	1k1	1	0W35	MF	0001-0001.235/-
R22	4k42	1	0W35	MF	0001-0001.785/-
R23	90k9	1	0W35	MF	0001-0002.975/-
RV1	5k	20	0W5 Lin.	Variable	0000-7574.283/-
C1	220n		100V		0001-0010.404/-
C2	220n		100V		0001-0010.404/-
C3	22µ		40V	Elec.	0001-0041.716/-
C4	680p	10	63V	Cer.	0001-0004.685/-
C5	22µ		40V	Elec.	0001-0041.716/-
C6	100n	10	100V		0001-0010.365/-
C7	22n	10	40V		0001-0006.418/-
C8	6µ8		35V	Elec.	0001-0040.856/-
TR1				BDX 33B	0000-7591.059/-
TR2				BC109	0000-7602.029/-
TR3				BDX 33B	0000-7591.059/-
TR4				BC109	0000-7602.029/-
TR5				BC109	0000-7602.029/-
TR6				BC109	0000-7602.029/-
TR7				2N2905	0001-0017.287/-
TR8				MJE 3055	0001-0017.148/-
D1				1N4004	0000-7605.026/-
D2				1N4004	0000-7605.026/-
D3				1N4004	0000-7605.026/-
D4				1N4004	0000-7605.026/-
D5				1N4448	0001-0018.493/-
D6				BZY88/C16	0001-0019.159/-
D7				1N4448	0001-0018.493/-
D8				1N4004	0000-7605.026/-
D9				1N4448	0001-0018.493/-
D10				1N4448	0001-0018.493/-
D11				BZY88/C27	0000-7594.687/-
D12				ZPD 5.1	0001-0018.833/-
D13				1N4448	0001-0018.493/-
IC1				µA 723	0001-0015.852/-
SK1				EDGE CONNECTOR, 12-WAY	0000-7606.054/-
A84				P.C.B. POWER SUPPLY	
				UNIT (less components)	4502-0284.007/3

ASSEMBLY P.C.B. A134 INTERFACE

REF.	VALUE	TOL.± %	RATING	TYPE	PART NO.
R1	20k	1	0W35	MF	0001-0002.409/-
R2	20k	1	0W35	MF	0001-0002.409/-
R3	10k	1	0W35	MF	0001-0002.137/-
R4	20k	1	0W35	MF	0001-0002.409/-
R5	20k	1	0W35	MF	0001-0002.409/-
R6	10k	1	0W35	MF	0001-0002.137/-
R7	10k	1	0W35	MF	0001-0002.137/-
R8	20k	1	0W35	MF	0001-0002.409/-
R9	10k	1	0W35	MF	0001-0002.137/-
R10	20k	1	0W35	MF	0001-0002.409/-
R11	10k	1	0W35	MF	0001-0002.137/-
R12	20k	1	0W35	MF	0001-0002.409/-
R13	100R	1	0W35	MF	0001-0000.537/-
R14	2k67	1	0W35	MF	0001-0001.578/-
R15	6k19	1	0W35	MF	0001-0001.934/-
R16	20k	1	0W35	MF	0001-0002.409/-
R17	475k	1	0W35	MF	0001-0003.343/-
R18	619R	1	0W35	MF	0001-0001.044/-
R19	39k2	1	0W35	MF	0001-0002.658/-
R20	68k1	1	0W35	MF	0001-0002.878/-
R21	100k	1	0W35	MF	0001-0002.991/-
R22	1k21	1	0W35	MF	0001-0001.277/-
R23	22k1	1	0W35	MF	0001-0002.441/-
R24	8k25	1	0W35	MF	0001-0002.056/-
R25	20k	1	0W35	MF	0001-0002.409/-
R26	10k	1	0W35	MF	0001-0002.137/-
R27	100k	1	0W35	MF	0001-0002.991/-
R28	100k	1	0W35	MF	0001-0002.991/-
R29	51k1	1	0W35	MF	0001-0002.768/-
R30	100k x 9	2	0W2	S.I.L. PACK	0000-7604.441/-
R31	100k x 9	2	0W2	S.I.L. PACK	0000-7604.441/-
R32	100k	1	0W35	MF	0001-0002.991/-
R33	100k	1	0W35	MF	0001-0002.991/-
R34	100k	1	0W35	MF	0001-0002.991/-
R35	100k	1	0W35	MF	0001-0002.991/-
R36	100k	1	0W35	MF	0001-0002.991/-
R37	100k	1	0W35	MF	0001-0002.991/-
L1	4.7µH	10	230mA	INDUCTOR	0000-7556.133/-
L2	4.7µH	10	230mA	INDUCTOR	0000-7556.133/-
C1	22n	20	40	Cer.	0001-0006.418/-
C2	4µ7	10	63	Al. Ox.	0000-7605.770/-
C3	220n	10	100	PE .	0001-0010.404/-
C4	22n	20	40	Cer.	0000-0006.418/-
C5	22n	20	40	Cer.	0000-0006.418/-
C6	22n	20	40	Cer.	0000-0006.418/-
C7	22n	20	40	Cer.	0000-0006.418/-
C8	22n	20	40	Cer.	0000-0006.418/-
C9	22n	20	40	Cer.	0000-0006.418/-
C10	22n	20	40	Cer.	0000-0006.418/-
C11	22n	20	40	Cer.	0000-0006.418/-
C12	22n	20	40	Cer.	0000-0006.418/-
TR1				BCY71	0001-0016.534/-
TR2				BCY71	0001-0016.534/-
TR3				BCY71	0001-0016.534/-
TR4				BC109C	0000-7602.126/-
D1				1N4448	0001-0018.493/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
RV1	10k	20	0W5	Var.	0000-7603.154/-
RV2	5k	20	0W2	Var.	0000-7537.916/-
IC1				4011	0001-0015.988/-
IC2				4028	0001-0067.567/-
IC3				4028	0001-0067.567/-
IC4				4013	0001-0015.991/-
IC5				40174	0000-7565.399/-
IC6				4042	0001-0061.987/-
IC7				4042	0001-0061.987/-
IC8				4042	0001-0061.987/-
IC9				4013	0001-0015.991/-
IC10				4042	0001-0061.987/-
IC11				4042	0001-0061.987/-
IC12				4042	0001-0061.987/-
IC13				4042	0001-0061.987/-
IC14				4042	0001-0061.987/-
IC15				4042	0001-0061.987/-
IC16				40174	0000-7565.399/-
IC17				40174	0000-7565.399/-
IC18				40174	0000-7565.399/-
IC19				40174	0000-7565.399/-
IC20				4011	0001-0015.988/-
A134				P.C.B. INTERFACE	4501-0134.002/2

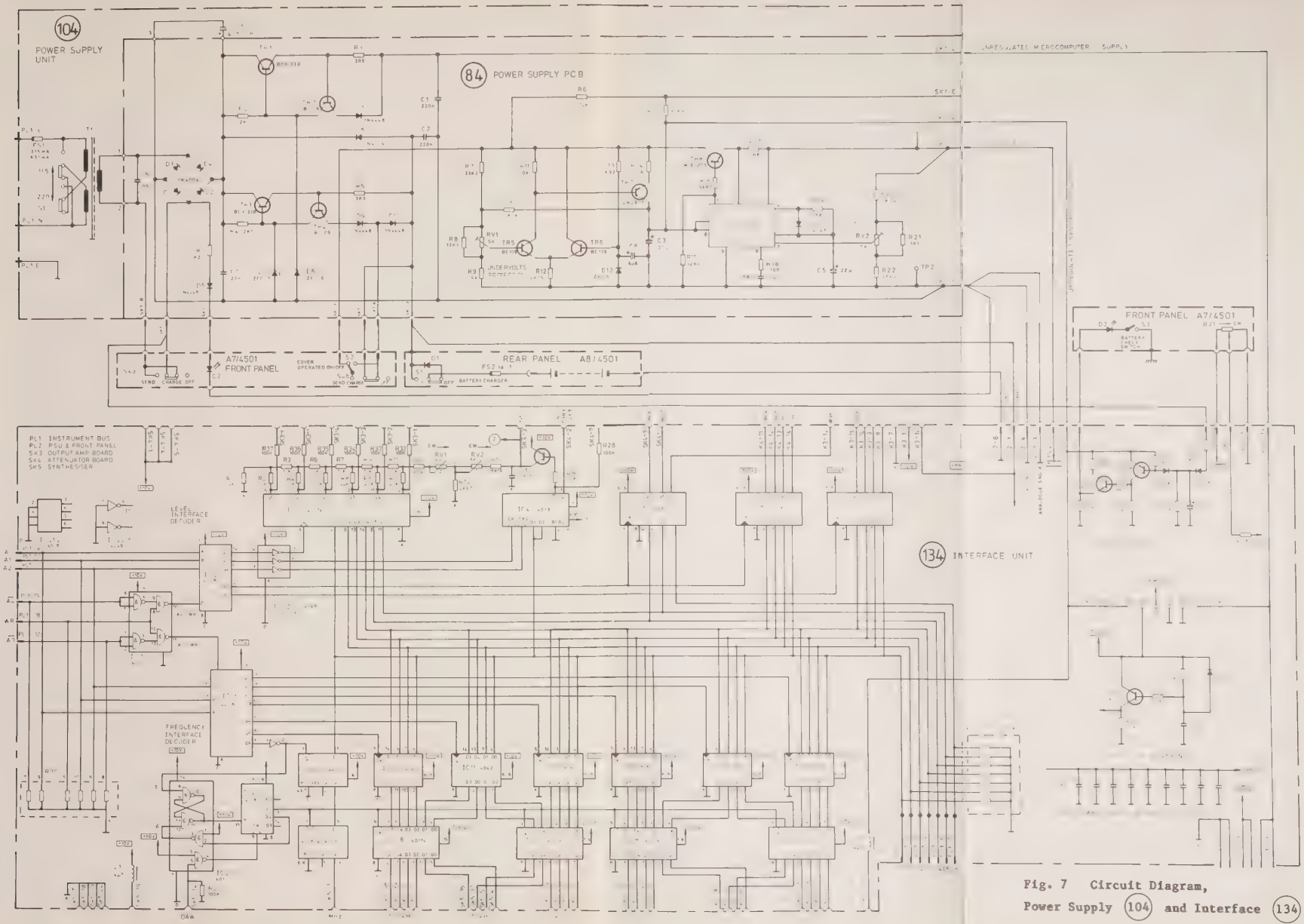
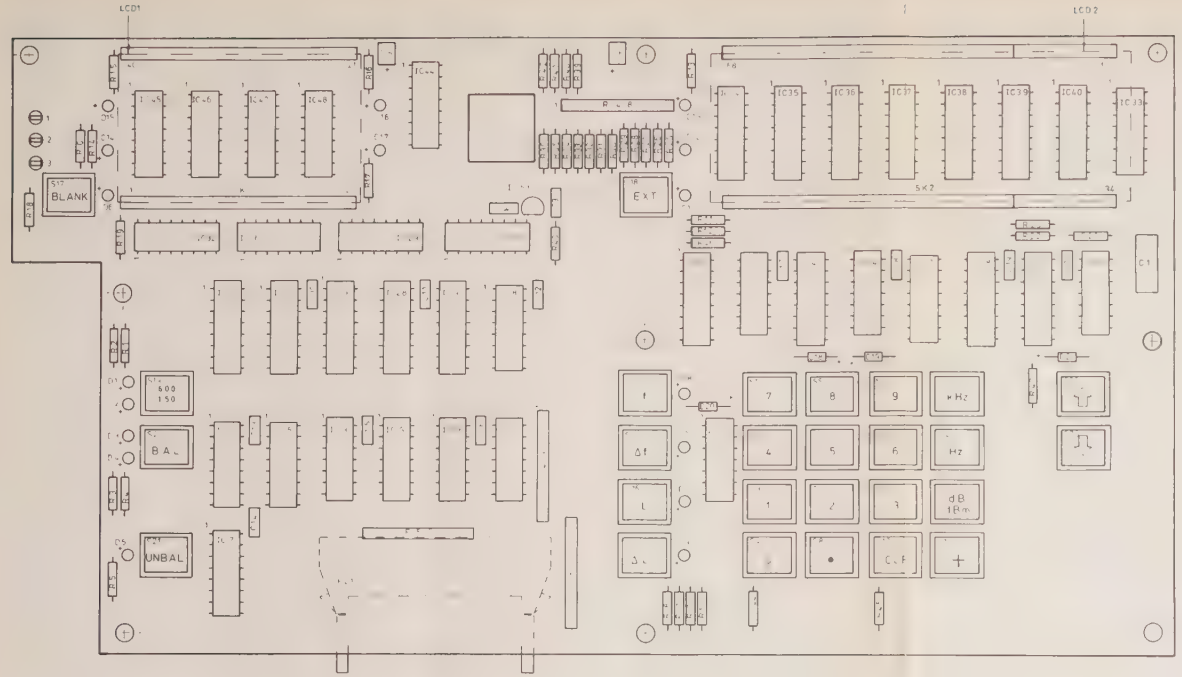


Fig. 7 Circuit Diagram, Power Supply (104) and Interface (134)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER e.g.
IC1 BECOMES IC13601
R5 BECOMES R13605

Fig. 8
Component Layout, Front Panel - Keyboard and Function Control P.C.B. (136)

ASSEMBLY P.C.B. A136 KEYBOARD AND DISPLAY

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	681R	1	0W35	MF	0001-0001.086/-
R2	681R	1	0W35	MF	0001-0001.086/-
R3	681R	1	0W35	MF	0001-0001.086/-
R4	681R	1	0W35	MF	0001-0001.086/-
R5	681R	1	0W35	MF	0001-0001.086/-
R6	825R	1	0W35	MF	0001-0001.154/-
R7	681R	1	0W35	MF	0001-0001.086/-
R8	681R	1	0W35	MF	0001-0001.086/-
R9	681R	1	0W35	MF	0001-0001.086/-
R10	681R	1	0W35	MF	0001-0001.086/-
R11	825R	1	0W35	MF	0001-0001.154/-
R12	681R	1	0W35	MF	0001-0001.086/-
R13	681R	1	0W35	MF	0001-0001.086/-
R14	681R	1	0W35	MF	0001-0001.086/-
R15	681R	1	0W35	MF	0001-0001.086/-
R16	681R	1	0W35	MF	0001-0001.086/-
R17	681R	1	0W35	MF	0001-0001.086/-
R18	10k	1	0W35	MF	0001-0002.137/-
R19	100k	1	0W35	MF	0001-0002.991/-
R20	47k5	1	0W35	MF	0001-0002.739/-
R22	10k	1	0W35	MF	0001-0002.137/-
R23	10k	1	0W35	MF	0001-0002.137/-
R24	10k	1	0W35	MF	0001-0002.137/-
R25	10K	1	0W35	MF	0001-0002.137/-
R26	10k	1	0W35	MF	0001-0002.137/-
R27	10k	1	0W35	MF	0001-0002.137/-
R28	10k	1	0W35	MF	0001-0002.137/-
R29	10k	1	0W35	MF	0001-0002.137/-
R30	10k	1	0W35	MF	0001-0002.137/-
R31	10k	1	0W35	MF	0001-0002.137/-
R32	10k	1	0W35	MF	0001-0002.137/-
R33	10k	1	0W35	MF	0001-0002.137/-
R34	10k	1	0W35	MF	0001-0002.137/-
R35	10k	1	0W35	MF	0001-0002.137/-
R36	10k	1	0W35	MF	0001-0002.137/-
R37	10k	1	0W35	MF	0001-0002.137/-
R38	10k	1	0W35	MF	0001-0002.137/-
R39	10k	1	0W35	MF	0001-0002.137/-
R40	10k	1	0W35	MF	0001-0002.137/-
R41	10k	1	0W35	MF	0001-0002.137/-
R42	10k	1	0W35	MF	0001-0002.137/-
R43	10R	1	0W35	MF	0001-0000.074/-
R44	10k	1	0W35	MF	0001-0002.137/-
R45	10k	1	0W35	MF	0001-0002.137/-
R46	10k	1	0W35	MF	0001-0002.137/-
R47	10k	1	0W35	MF	0001-0002.137/-
R48	10k x 9	2	1W25	S.I.L. PACK	0000-7606.601/-
R49	10k x 9	2	1W25	S.I.L. PACK	0000-7606.601/-
R50	100k x 9	2	0W2	S.I.L. PACK	0000-7604.441/-
R51	100k x 9	2	0W2	S.I.L. PACK	0000-7604.441/-
C1	15n	10	100	PE	0001-0010.239/-
C3	22n	20	40	Cer.	0001-0006.418/-
C4	22n	20	40	Cer.	0001-0006.418/-
C5	1u	20	35	Tant.	0001-0040.704/-
C6	1u	20	35	Tant.	0001-0040.704/-
C10	22n	20	40	Cer.	0001-0006.418/-
C11	22n	20	40	Cer.	0001-0006.418/-
C12	22n	20	40	Cer.	0001-0006.418/-
C13	22n	20	40	Cer.	0001-0006.418/-
C14	22n	20	40	Cer.	0001-0006.418/-
C15	22n	20	40	Cer.	0001-0006.418/-
C16	22n	20	40	Cer.	0001-0006.418/-
C17	22n	20	40	Cer.	0001-0006.418/-
C18	22n	20	40	Cer.	0001-0006.418/-
C19	22n	20	40	Cer.	0001-0006.418/-
C20	22n	20	40	Cer.	0001-0006.418/-
D1				L.E.D. GREEN	0000-7536.881/-
D2				L.E.D. GREEN	0000-7536.881/
D3				L.E.D. GREEN	0000-7536.881/-
D4				L.E.D. GREEN	0000-7536.881/-
D5				L.E.D. GREEN	0000-7536.881/-
D6				L.E.D. RED	0000-7536.878/-
D7				L.E.D. GREEN	0000-7536.881/-
D8				L.E.D. GREEN	0000-7536.881/-
D9				L.E.D. GREEN	0000-7536.881/-
D10				L.E.D. GREEN	0000-7536.881/-
D11				L.E.D. RED	0000-7536.878/-
D12				L.E.D. GREEN	0000-7536.881/-
D13				L.E.D. GREEN	0000-7536.881/-
D14				L.E.D. GREEN	0000-7536.881/-
D15				L.E.D. GREEN	0000-7536.881/-
D16				L.E.D. GREEN	0000-7536.881/-
D17				L.E.D. GREEN	0000-7536.881/-
D18				1N4448	0001-0018.493/-
D19				1N4448	0001-0018.493/-
D20				1N4448	0001-0018.493/-
D21				1N4448	0001-0018.493/-
LCD1				3½ Digit	0000-7603.738/-
LCD2				7½ Digit	0000-7603.727/-
IC3				4081	0001-0070.884/-
IC4				4042	0001-0061.987/-
IC5				4028	0001-0067.567/-
IC6				4011	0001-0015.988/-
IC7				4572	0001-0068.540/-
IC8				4503	0000-7548.853/-

ASSEMBLY P.C.B. A136 KEYBOARD AND DISPLAY (continued)

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
IC9				4503	0000-7548.853/-
IC10				4042	0001-0061.987/-
IC12				4068	0001-0070.907/-
IC15				4042	0001-0061.987/-
IC16				4050	0000-7519.840/-
IC17				4572	0001-0068.540/-
IC18				4518	0001-0016.178/-
IC19				4042	0001-0061.987/-
IC20				4042	0001-0061.987/-
IC21				4081	0001-0070.884/-
IC22				4050	0000-7519.840/-
IC23				4047	0000-7565.360/-
IC24				4013	0001-0015.991/-
IC25				4049	0001-0068.197/-
IC26				4071	0000-7514.845/-
IC27				4040	0001-0065.462/-
IC28				4042	0001-0061.989/-
IC29				4050	0000-7519.840/-
IC31				4013	0001-0015.991/-
IC32				4049	0001-0068.197/-
IC33				4054	0000-7543.913/-
IC34				4543	0001-0068.618/-
IC35				4543	0001-0068.618/-
IC36				4543	0001-0068.618/-
IC37				4543	0001-0068.618/-
IC38				4543	0001-0068.618/-
IC39				4543	0001-0068.618/-
IC40				4543	0001-0068.618/-
IC44				4028	0001-0067.567/-
IC45				4054	0000-7543.913/-
IC46				4543	0001-0068.618/-
IC47				4543	0001-0068.618/-
IC48				4543	0001-0068.618/-
IC51				78 LO 5AC	0000-7591.046/-
A136				P.C.B. FRONT PANEL	4501-0136.000/1

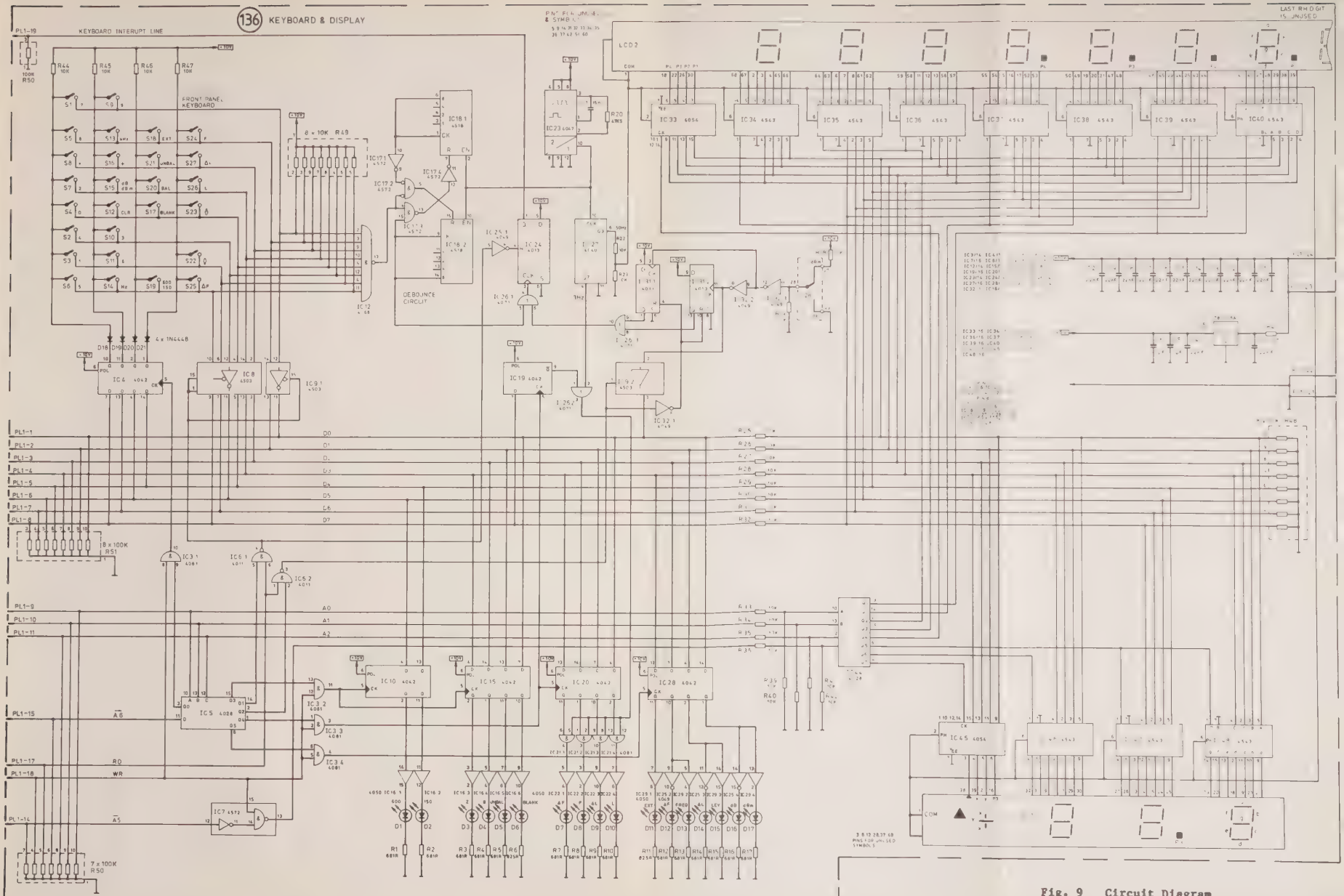
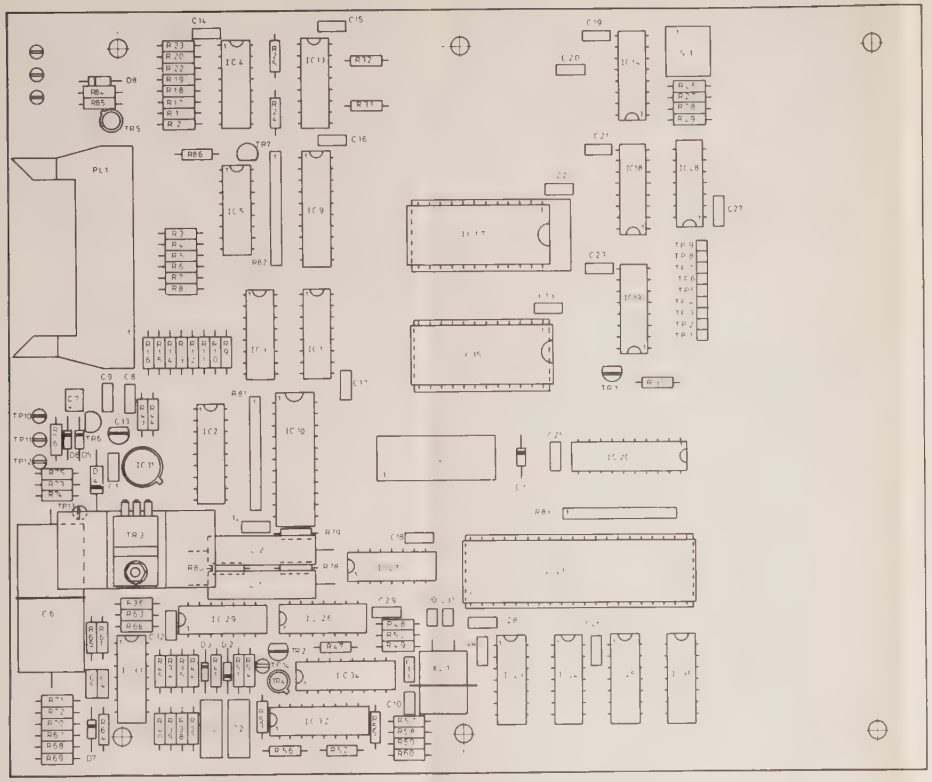


Fig. 9 Circuit Diagram,
Keyboard and Function Control P.C.B. 136



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER e.g.
IC30 BECOMES IC13530
R69 BECOMES R13569

Fig. 10 Component Layout, Microcomputer (135)

ASSEMBLY P.C.B. A135 MICROCOMPUTER

REF.	VALUE	TOL. ±%	RATING	TYPE	PART NO.
R1	1k0	1	0W35		0000-0006.557/-
R2	1k0	1	0W35		0000-0006.557/-
R3	1k0	1	0W35		0000-0006.557/-
R4	1k0	1	0W35		0000-0006.557/-
R5	1k0	1	0W35		0000-0006.557/-
R6	1k0	1	0W35		0000-0006.557/-
R7	1k0	1	0W35		0000-0006.557/-
R8	1k0	1	0W35		0000-0006.557/-
R9	1k0	1	0W35		0000-0006.557/-
R10	1k0	1	0W35		0000-0006.557/-
R11	1k0	1	0W35		0000-0006.557/-
R12	1k0	1	0W35		0000-0006.557/-
R13	1k0	.	0W35		0000-0006.557/-
R14	1k0	1	0W35		0000-0006.557/-
R15	1k0	.	0W35		0000-0006.557/-
R16	1k0	1	0W35		0000-0006.557/-
R17	1k0	1	0W35		0000-0006.557/-
R18	1k0	1	0W35		0000-0006.557/-
R19	1k0	1	0W35		0000-0006.557/-
R20	1k0	1	0W35		0000-0006.557/-
R22	1k0	1	0W35		0000-0006.557/-
R23	1k0	1	0W35		0000-0006.557/-
R24	1k0	1	0W35		0000-0006.557/-
R25	1k0	1	0W35		0000-0006.557/-
R26	10k	1	0W35		0001-0002.137/-
R27	10k	1	0W35		0001-0002.137/-
R28	10k	.	0W35		0001-0002.137/-
R29	10k	1	0W35		0001-0002.137/-
R30	5k62	.	0W35		0001-0001.895/-
R31	15k	1	0W35		0001-0002.289/-
R32	15k	.	0W35		0001-0002.289/-
R34	33k2	.	0W35		0001-0002.603/-
R35	33k2	.	0W35		0001-0001.497/-
R36	2k21	1	0W35		0001-0002.519/-
R37	26k7	1	0W35		0001-0002.519/-
R38	26k7	.	0W35		0001-0002.519/-
R39	26k7	.	0W35		0001-0002.519/-
R40	26k7	.	0W35		0001-0002.218/-
R41	12k1	.	0W35		0001-0002.991/-
R42	100k	.	0W35		0001-0002.137/-
R43	10k		0W35		0001-0002.137/-
R44	10k		0W35		0001-0003.343/-
R45	475k		0W35		0001-0002.878/-
R47	68k1	.	0W35		0001-0002.137/-
R48	10k	.	0W35		0001-0003.110/-
R49	150k		0W35		0001-0002.603/-
R50	33k2	.	0W35		0001-0002.137/-
R51	10k	.	0W35		0001-0002.014/-
R52	7k5	.	0W35		0001-0001.662/-
R53	3k32	.	0W35		0001-0001.219/-
R54	1k		0W35		0001-0002.056/-
R55	8k25	.	0W35		0001-0001.154/-
R56	825R		0W35		0001-0002.991/-
R57	100k		0W35		0001-0002.991/-
R58	100k	.	0W35		0001-0002.991/-
R59	100k	.	0W35		0001-0002.991/-
R60	100k	.	0W35		0001-0002.991/-
R61	1k		[illegible]		0001-0001.219/-
R62	10k	.	[illegible]		0001-0002.137/-
R63	47k5	1	[illegible]		0001-0002.739/-
R64	47k5		[illegible]		0001-0002.739/-
R65	1k		[illegible]		0001-0001.219/-
R66	1k		[illegible]		0001-0001.219/-
R67	10k	.	[illegible]		0001-0002.137/-
R68	100k	.	[illegible]		0001-0002.991/-
R69	100k	.	[illegible]		0001-0002.991/-
R70	332k	.	[illegible]		0001-0003.291/-
R71	35k7	.	[illegible]		0001-0002.616/-
R72	68k1	1	[illegible]		0001-0002.878/-
R73	18k2	.	[illegible]		0001-0002.360/-
R74	100R	.	[illegible]		0001-0000.537/-
R75	51k1	.	[illegible]		0001-0002.768/-
R76	33R2	.	[illegible]		0001-0000.537/-
R78	3R3	.	[illegible]		0001-0006.599/-
R79	1R0	.	[illegible]		0001-0006.557/-
R80	3R3	.	[illegible]		0001-0006.599/-
R81	9 x 47k			S.I.L PACK	0000-7606.517/-
R82	9 x 1k			S.I.L.PACK	0000-7606.533/-
R83	9 x 15k			S.I.L.PACK	0000-7606.520/-
R84	3k92	1	0W35		0001-0001.730/-
R85	100k		0W35		0001-0002.991/-

ASSEMBLY P.C.B. A135 MICROCOMPUTER (continued)

REF.	VALUE	TOL. ±%	RATING	TYPE	PART NO.
R86	1kO	1	OW35		0000-0006.557/-
C1	180p	2	63V	Cer.	0001-0004.591/-
C2	220n	10	100V	PF.	0001-0010.404/-
C3	220n	10	100V	PF.	0001-0010.404/-
C4	4n7	10	63V	Cer.	0001-0004.795/-
C5	4n7	10	63V	Cer.	0001-0004.795/-
C6	470µ	10	16V	Al. Ox.	0001-0041.910/-
C7	1µ	20	35V	Tant.	0001-0040.704/-
C8	22n	20	40V	Cer.	0001-0006.418/-
C9	22n	20	40V	Cer.	0001-0006.418/-
C10	4n7	10	63V	Cer.	0001-0004.795/-
C11	4n7	10	63V	Cer.	0001-0004.795/-
C12	22n	20	40V	Cer.	0001-0006.418/-
C13	22n	20	40V	Cer.	0001-0006.418/-
C14	22n	20	40V	Cer.	0001-0006.418/-
C15	22n	20	40V	Cer.	0001-0006.418/-
C16	22n	20	40V	Cer.	0001-0006.418/-
C17	22n	20	40V	Cer.	0001-0006.418/-
C18	22n	20	40V	Cer.	0001-0006.418/-
C19	22n	20	40V	Cer.	0001-0006.418/-
C20	22n	20	40V	Cer.	0001-0006.418/-
C21	22n	20	40V	Cer.	0001-0006.418/-
C22	22n	20	40V	Cer.	0001-0006.418/-
C23	22n	20	40V	Cer.	0001-0006.418/-
C24	22n	20	40V	Cer.	0001-0006.418/-
C25	22n	20	40V	Cer.	0001-0006.418/-
C26	22n	20	40V	Cer.	0001-0006.418/-
C27	22n	20	40V	Cer.	0001-0006.418/-
C28	22n	20	40V	Cer.	0001-0006.418/-
C29	22n	20	40V	Cer.	0001-0006.418/-
C30	10p	2	63V	Cer.	0001-0004.177/-
C31	10p	2	63V	Cer.	0001-0004.177/-
C32	4n7	10	63V	Cer.	0001-0004.795/-
TR1				VN 10 LM	0000-7599.679/-
TR2				VN 10 LM	0000-7599.679/-
TR3				BDX 33 B	0000-7591.059/-
TR4				BCY71	0001-0016.534/-
TR5				BCY71	0001-0016.534/-
TR6				J176	0000-7591.169/-
TR7				VN 10 LM	0000-7599.679/-
D1				1N5711	0001-0018.228/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
D4				1N4004	0000-7605.026/-
D5				1N4448	0001-0018.493/-
D6				1N4448	0001-0018.493/-
D7				1N4448	0001-0018.493/-
D8				BZY88/6V	0001-0018.930/-
IC1				(CMOS)4028	0001-0067.567/-
IC2				(CMOS)CDP1824E	0000-7529.584/-
IC3				(CMOS)4049	0001-0068.197/-
IC4				(CMOS)4504	0000-7569.450/-
IC5				(CMOS)4504	0000-7569.450/-
IC9				(TTL)74 LS 240	0001-0071.919/-
IC10				40116	0000-7583.889/-
IC13				(TTL)74 LS 368	0002-0071.951/-
IC14				(TTL)74 LS 367	0001-0071.948/-

ASSEMBLY P.C.B. A135 MICROCOMPUTER (continued)

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
IC15				(CMOS)HM6116LP-3	0000-7580.992/-
IC17				(NMOS)D2732A	4502-9311.088/4
IC18				(TTL)74 LS 138	0001-0070.512/-
IC19				(TTL)74 LS 138	0001-0070.512/-
IC20				(TTL)74 LS 373	0001-0071.346/-
IC21				(NMOS)8085A	0000-7548.536/-
IC23				(TTL)74 LS 393	0000-7555.901/-
IC24				(TTL)74 LS 04	0001-0067.156/-
IC25				(TTL)74 LS 00	0001-0065.695/-
IC26				(TTL)74 LS 74	0001-0056.837/-
IC27				(TTL)74 LS 08	0001-0067.169/-
IC28				(TTL)74 LS 02	0001-0065.585/-
IC29				(CMOS)4011	0001-0015.988/-
IC30				LM 339	0000-7547.265/-
IC31				TAA 861	0001-0016.291/-
IC32				CA 3096 AE	0000-7511.521/-
IC33				78 LO 5A	0000-7591.046/-
IC34				CA 3096 AE	0000-7511.521/-
IC35				(TTL)74 LS 00	0001-0065.695/-
L1	56µH	20	1.5A		0001-0042.715/-
L2	56µH	20	1.5A		0001-0042.715/-
PL1				26-WAY	0000-7603.714/-
XL1	4.9152MHz				0000-7603.536/-
S1				4-WAY D.I.L.	0000-7541.779/-
S2				10-WAY D.I.L.	0001-0072.361/-
A135				P.C.B.MICROPROCESSOR	4501-0135.001/1

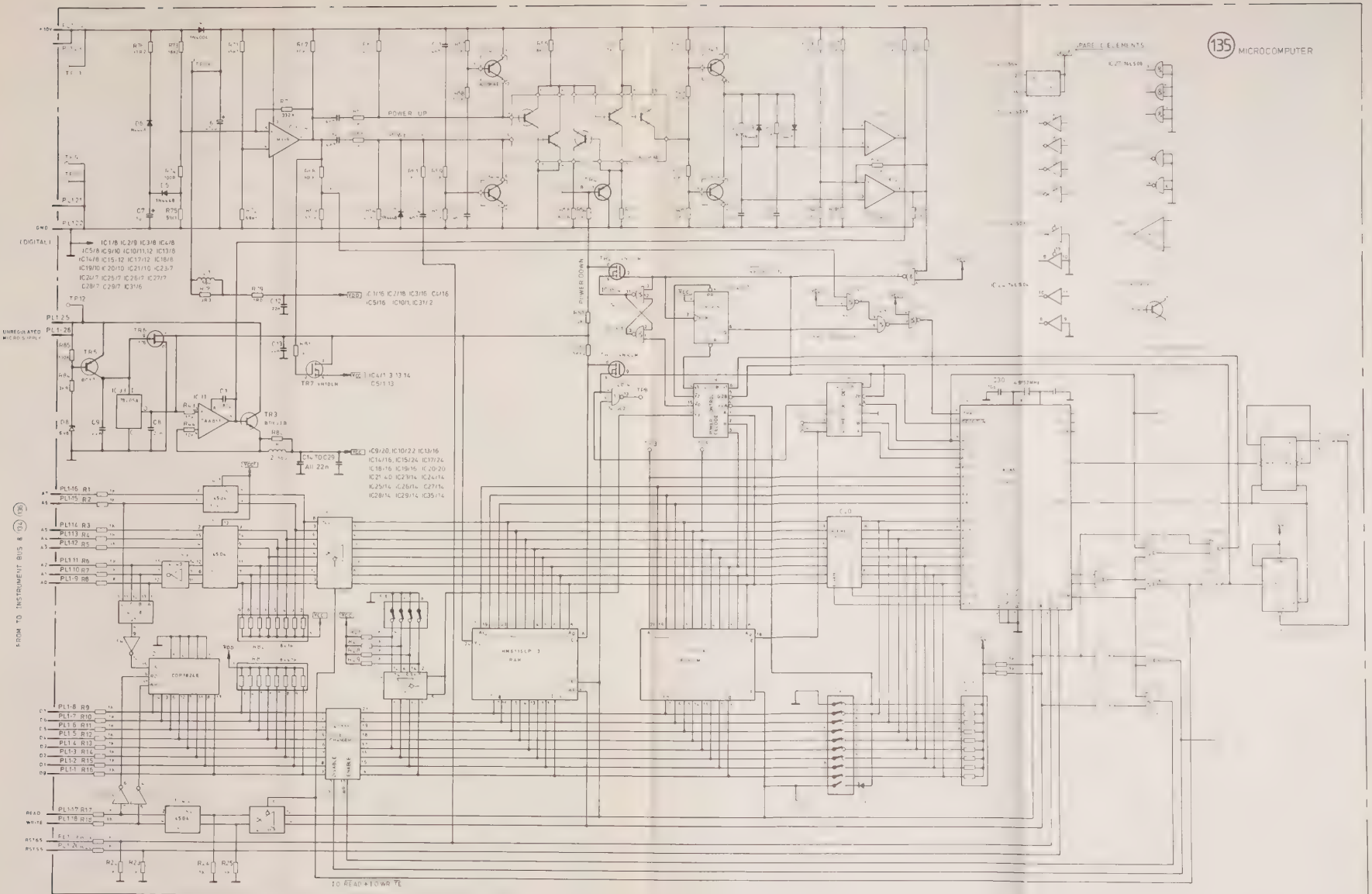
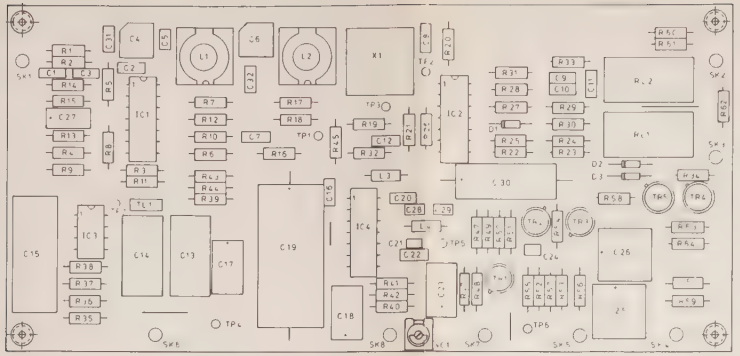
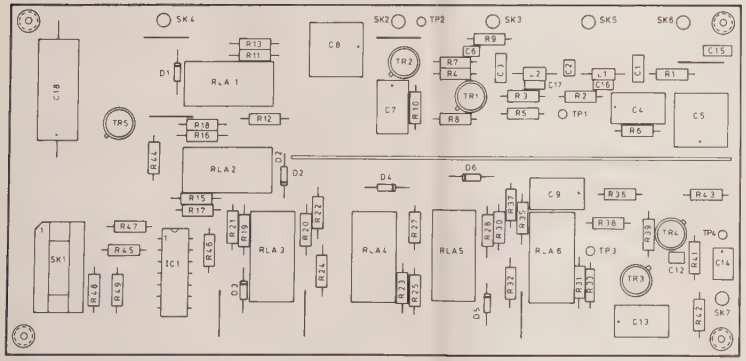


Fig. 11
Circuit Diagram, Microcomputer (135)



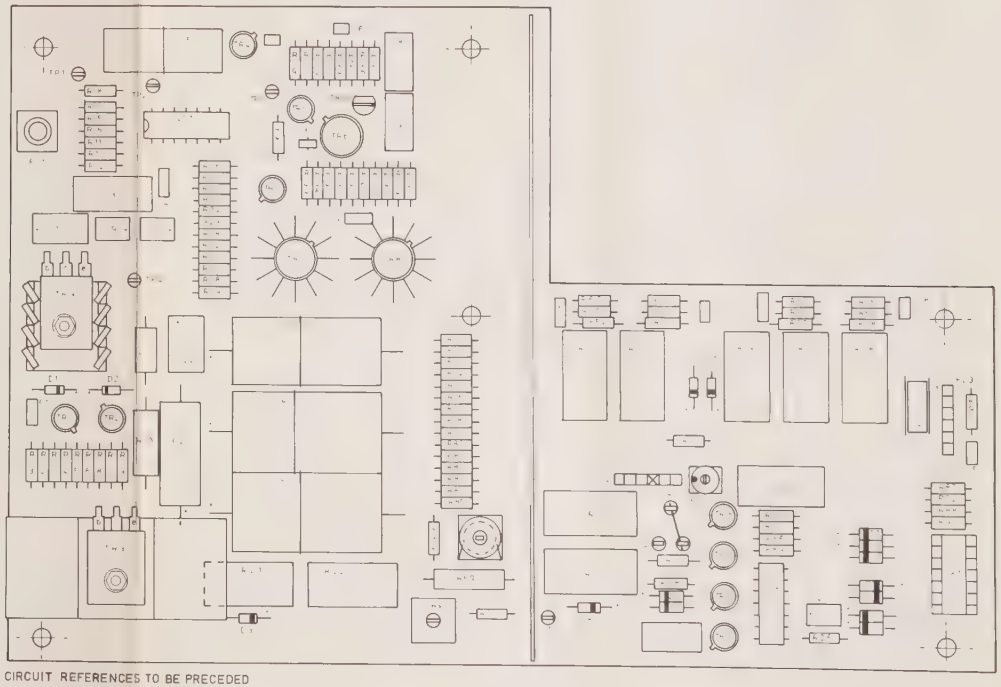
CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER e g
C15 BECOMES C13115
R35 BECOMES R13135

Fig. 12 Component Layout, Converter (131)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER e.g.
R48 BECOMES R13248
IC1 BECOMES IC13201

Fig. 13 Component Layout, Attenuator (132)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER e g
R3 BECOMES R13303
TR3 BECOMES TR13303

Fig. 14 Component Layout, Output Amplifier (133)

ASSEMBLY P.C.B. A131 CONVERTER

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	82R5	1	0W35	MF	0001-0000.472/-
R2	15k	1	0W35	MF	0001-0002.289/-
R3	3k32	1	0W35	MF	0001-0001.662/-
R4	68R1	1	0W35	MF	0001-0000.427/-
R5	4k75	1	0W35	MF	0001-0001.824/-
R6	6k81	1	0W35	MF	0001-0001.976/-
R7	10k	1	0W35	MF	0001-0002.137/-
R8	1k1	1	0W35	MF	0001-0001.235/-
R9	1k	1	0W35	MF	0001-0001.219/-
R10	68R1	1	0W35	MF	0001-0000.427/-
R11	2k	1	0W35	MF	0001-0001.455/-
R12	5k11	1	0W35	MF	0001-0001.853/-
R13	475R	1	0W35	MF	0001-0000.964/-
R14	1k	1	0W35	MF	0001-0001.219/-
R15	68R1	1	0W35	MF	0001-0000.427/-
R16	100R	1	0W35	MF	0001-0000.537/-
R17	475R	1	0W35	MF	0001-0000.964/-
R18	475R	1	0W35	MF	0001-0000.964/-
R19	47R5	1	0W35	MF	0001-0003.518/-
R20	825R	1	0W35	MF	0001-0001.154/-
R21	562R	1	0W35	MF	0001-0001.015/-
R22	68R1	1	0W35	MF	0001-0000.427/-
R23	1k	1	0W35	MF	0001-0001.219/-
R24	1k	1	0W35	MF	0001-0001.219/-
R25	68R1	1	0W35	MF	0001-0000.427/-
R26	562R	1	0W35	MF	0001-0001.015/-
R27	68R1	1	0W35	MF	0001-0000.427/-
R28	221R	1	0W35	MF	0001-0000.715/-
R29	33k2	1	0W35	MF	0001-0002.603/-
R30	10k	1	0W35	MF	0001-0002.137/-
R31	5k62	1	0W35	MF	0001-0001.895/-
R32	2k43	1	0W35	MF	0001-0001.536/-
R33	243R	1	0W35	MF	0001-0000.731/-
R34	56R2	1	0W35	MF	0001-0000.346/-
R35	20k	1	0W35	MF	0001-0002.409/-
R36	20k	1	0W35	MF	0001-0002.409/-
R37	10k	1	0W35	MF	0001-0002.137/-
R38	10k	1	0W35	MF	0001-0002.137/-
R39	39k2	1	0W35	MF	0001-0002.658/-
R40	1k5	1	0W35	MF	0001-0001.358/-
R41	68R1	1	0W35	MF	0001-0000.427/-
R42	1k	1	0W35	MF	0001-0001.219/-
R43	100R	1	0W35	MF	0001-0000.537/-
R44	68k1	1	0W35	MF	0001-0002.878/-
R45	10R	1	0W35	MF	0001-0000.074/-
R46	392R	1	0W35	MF	0001-0000.896/-
R47	3k57	1	0W35	MF	0001-0001.691/-
R48	12k1	1	0W35	MF	0001-0002.218/-
R49	68R1	1	0W35	MF	0001-0000.427/-
R50	301R	1	0W35	MF	0001-0000.799/-
R51	68R1	1	0W35	MF	0001-0000.427/-
R52	100R	1	0W35	MF	0001-0000.537/-
R53	2k43	1	0W35	MF	0001-0001.536/-
R54	68R1	1	0W35	MF	0001-0000.427/-
R55	1k	1	0W35	MF	0001-0001.219/-
R56	2k21	1	0W35	MF	0001-0001.497/-
R57	432R	1	0W35	MF	0001-0000.935/-
R58	100R	1	0W35	MF	0001-0000.537/-
R59	47k5	1	0W35	MF	0001-0002.739/-
R60	221R	1	0W35	MF	0001-0000.715/-
R61	56R2	1	0W35	MF	0001-0000.346/-
R62	221R	1	0W35	MF	0001-0000.715/-
R63	30k1	1	0W35	MF	0001-0002.564/-
R64	30k1	1	0W35	MF	0001-0002.564/-
C1	22n	20	40V	Cer.	0001-0006.418/-
C2	22n	20	40V	Cer.	0001-0006.418/-
C3	22n	20	40V	Cer.	0001-0006.418/-
C4	820p	2	63V	PF.	0000-7599.789/-
C5	39p	2	63V	Cer.	0001-0004.371/-
C6	820p	2	63V	PF.	0000-7599.789/-
C7	22n	20	40V	Cer.	0001-0006.418/-
C8	22n	20	40V	Cer.	0001-0006.418/-
C9	22n	20	40V	Cer.	0001-0006.418/-
C10	22n	20	40V	Cer.	0001-0006.418/-
C11	22n	20	40V	Cer.	0001-0006.418/-
C12	22n	20	40V	Cer.	0001-0006.418/-
C13	330n	10	100V	PF.	0001-0010.420/-
C14	680n	10	100V	PF.	0001-0010.462/-
C15	3µ3	10	100V	PF.	0001-0010.572/-
C16	22n	20	40V	Cer.	0001-0006.418/-
C17	47µ	20	16V	Tant.	0001-0041.062/-
C18	68µ	20	16V	Tant.	0001-0041.114/-
C19	470µ	10	16V	Al. Ox.	0001-0041.910/-
C20	120p	2	63V	Cer.	0001-0004.562/-
C21	390p	10	63V	Cer.	0001-0004.656/-
C22	120p	2	63V	Cer.	0001-0004.562/-
C23	100µ	20	10V	Tant.	0001-0041.156/-
C24	18p	2	63V	Cer.	0001-0004.258/-
C25	330µ	20	6.3V	Tant.	0001-0041.211/-
C26	220µ	20	10V	Tant.	0001-0041.208/-
C27	15µ	20	16V	Tant.	0001-0040.924/-
C28	39p	2	63V	Cer.	0001-0004.371/-
C29	39p	2	63V	Cer.	0001-0004.371/-
C30	10µ	10	63V	Al. Ox.	0001-0041.693/-
C31	100p	2	63V	Cer.	0001-0004.517/-
C32	100p	2	63V	Cer.	0001-0004.517/-
TR1				2N2369A	0000-7542.066/-
TR2				2N2894	0001-0016.929/-
TR3				2N2369A	0000-7542.066/-
TR4				BC109	0000-7602.029/-
TR5				BC109	0000-7602.029/-
D1				1N4448	0001-0018.493/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
VC1	2-18p			300 Trimmer	0000-7598.463/-
IC1				3086	0000-7601.952/-
IC2				3086	0000-7601.952/-
IC3				1458	0001-0014.989/-
IC4				3086	0000-7601.952/-
L1	1.5µH			INDUCTOR	4502-1412.001/4
L2	1.5µH			INDUCTOR	4502-1412.001/4
L3	33µH			INDUCTOR	0000-7556.230/-
L4	33µH			INDUCTOR	0000-7556.230/-
L5	10µH			INDUCTOR	0000-7556.175/-

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
RL1				RSD - 12V	0001-0069.620/-
RL2				RSD - 12V	0001-0069.620/-
X1				MIXER	1769-1000.604/2
A131				P.C.B. CONVERTER	4501-0131.005/2

ASSEMBLY P.C.B. A132 ATTENUATOR

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	301R	1	0W35	MF	0001-0000.799/-
R2	332R	1	0W35	MF	0001-0000.838/-
R3	68R1	1	0W35	MF	0001-0000.427/-
R4	681R	1	0W35	MF	0001-0001.086/-
R5	200R	1	0W35	MF	0001-0000.676/-
R6	3k92	1	0W35	MF	0001-0001.730/-
R7	68R1	1	0W35	MF	0001-0000.427/-
R8	1k21	1	0W35	MF	0001-0001.277/-
R9	432R	1	0W35	MF	0001-0000.935/-
R10	100R	1	0W35	MF	0001-0000.537/-
R11	110R	0.25	0W25	MF	0000-7570.847/-
R12	4k12	0.25	0W25	MF	0000-7517.871/-
R13	107R	0.25	0W25	MF	0000-7577.206/-
R15	422R	0.1	0W25	MF	0000-7599.750/-
R16	184R	0.1	0W25	MF	0000-7599.718/-
R17	150k	1	0W35	MF	0001-0003.110/-
R18	193k	0.1	0W25	MF	0000-7599.734/-
R19	453R	0.1	0W25	MF	0000-7599.763/-
R20	111R	0.1	0W25	MF	0000-7520.185/-
R21	68k1	1	0W35	MF	0001-0002.878/-
R22	111R	1	0W35	MF	0000-7520.185/-
R23	104R	0.25	0W25	MF	0000-7584.040/-
R24	1k93	0.25	0W25	MF	0000-7599.705/-
R25	10k	1	0W35	MF	0001-0002.137/-
R27	301R	0.1	0W25	MF	0000-7576.100/-
R28	332R	0.1	0W25	MF	0000-7599.747/-
R30	82k5	1	0W35	MF	0001-0002.933/-
R31	187R	0.1	0W25	MF	0000-7599.721/-
R32	856R	0.1	0W25	MF	0000-7599.776/-
R33	15k	1	0W35	MF	0001-0002.289/-
R35	511R	0.25	0W25	MF	0000-7579.712/-
R36	75k	1	0W35	MF	0001-0002.904/-
R37	39k2	1	0W35	MF	0001-0002.658/-
R38	68R1	1	0W35	MF	0001-0000.427/-
R39	1k5	1	0W35	MF	0001-0001.358/-
R41	475R	1	0W35	MF	0001-0000.964/-
R42	475R	1	0W35	MF	0001-0000.964/-
R43	100R	1	0W35	MF	0001-0000.537/-
R44	20k	1	0W35	MF	0001-0002.409/-
R45	20k	1	0W35	MF	0001-0002.409/-
R46	20k	1	0W35	MF	0001-0002.409/-
R47	20k	1	0W35	MF	0001-0002.409/-
R48	20k	1	0W35	MF	0001-0002.409/-
R49	20k	1	0W35	MF	0001-0002.409/-

ASSEMBLY P.C.B. A132 ATTENUATOR (continued)

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
C1	120p	2	63V	Cer.	0001-0004.562/-
C2	390p	10	63V	Cer.	0001-0004.418/-
C3	120p	2	63V	Cer.	0001-0004.562/-
C4	100µ	20	10V	Tant.	0001-0041.156/-
C5	150µ	20	16V	Tant.	0001-0041.198/-
C6	18p	2	63V	Cer.	0001-0004.258/-
C7	47µ	20	6.3V	Tant.	0001-0041.059/-
C8	220µ	20	10V	Tant.	0001-0041.208/-
C9	100µ	20	10V	Tant.	0001-0041.156/-
C12	4p7		63V	Cer.	0001-0004.083/-
C13	47µ	20	6.3V	Tant.	0001-0041.059/-
C14	15µ	20	16V	Tant.	0001-0040.924/-
C15	22n	20	40V	Cer.	0001-0006.418/-
C16	39p	2	63V	Cer.	0001-0004.371/-
C17	39p	2	63V	Cer.	0001-0004.371/-
C18	10µ	10	63V	Al. Ox.	0001-0041.693/-
TR1				2N2369A	0000-7542.066/-
TR2				2N2894	0001-0016.929/-
TR3				2N2369A	0000-7542.066/-
TR4				2N2894	0001-0016.929/-
TR5				BC109	0000-7602.126/-
D1				1N4448	0001-0018.493/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
D4				1N4448	0001-0018.493/-
D5				1N4448	0001-0018.493/-
D6				1N4448	0001-0018.493/-
IC1				3086	0000-7601.952/-
L1	33µH			INDUCTOR	0000-7556.230/-
L2	33µH			INDUCTOR	0000-7556.230/-
RL1 - 6				RSD - 12V	0001-0069.620/-
A132				P.C.B. ATTENUATOR	4501-0132.004/2

ASSEMBLY P.C.B. A133 OUTPUT AMPLIFIER

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	221R	1	0W35	MF	0001-0000.715/-
R2	6k19	1	0W35	MF	0001-0001.934/-
R3	1k62	1	0W35	MF	0001-0001.387/-
R4	68R1	1	0W35	MF	0001-0000.427/-
R5	3k32	1	0W35	MF	0001-0001.662/-
R6	10k	1	0W35	MF	0001-0002.137/-
R7	68R1	1	0W35	MF	0001-0000.427/-
R8	2k21	1	0W35	MF	0001-0001.497/-
R9	33R2	1	0W35	MF	0001-0000.265/-
R10	1R2	5	2W	W/W	0000-7603.138/-
R11	232k	1	0W35	MF	0001-0063.325/-
R12	182k	1	0W35	MF	0001-0003.165/-
R13	100R	1	0W35	MF	0001-0000.537/-
R14	82k5	1	0W35	MF	0001-0002.933/-
R15	100k	1	0W35	MF	0001-0002.991/-
R16	56k2	1	0W35	MF	0001-0002.797/-
R17	16k2	1	0W35	MF	0001-0002.315/-
R18	68R1	1	0W35	MF	0001-0000.427/-
R19	1k0	1	0W35	MF	0001-0001.219/-
R20	2k21	1	0W35	MF	0001-0001.497/-
R21	68R1	1	0W35	MF	0001-0000.427/-
R22	15R	1	0W35	MF	0001-0014.879/-
R23	1k5	1	0W35	MF	0001-0001.358/-
R24	511R	1	0W35	MF	0001-0003.770/-
R25	221R	1	0W35	MF	0001-0000.715/-
R26	43R2	1	0W35	MF	0001-0065.242/-
R27	100k	1	0W35	MF	0001-0002.991/-
R28	61k9	1	0W35	MF	0001-0002.836/-
R29	2k67	1	0W35	MF	0001-0001.578/-
R30	619k	1	0W35	MF	0001-0003.411/-
R31	68R1	1	0W35	MF	0001-0000.427/-
R32	2k67	1	0W35	MF	0001-0001.578/-
R33	130R	1	0W35	MF	0001-0000.582/-
R34	2k67	1	0W35	MF	0001-0001.578/-
R35	511R	1	0W35	MF	0001-0003.770/-
R36	2k67	1	0W35	MF	0001-0001.578/-
R37	511R	1	0W35	MF	0001-0003.770/-
R38	1R0	5	0W25	MF	0001-0006.557/-
R39	1R2	5	0W25	MF	0001-0006.560/-
R40	68R1	1	0W35	MF	0001-0000.427/-
R41	100R	1	0W35	MF	0001-0000.537/-
R42	68R1	1	0W35	MF	0001-0000.427/-
R43	68R1	1	0W35	MF	0001-0000.427/-
R44	4R7	5	0W25	MF	0001-0006.609/-
R45	4R7	5	0W25	MF	0001-0006.609/-
R46	1R5	5	0W25	MF	0001-0006.573/-
R47	15k	1	0W35	MF	0001-0002.289/-
R48	12k1	1	0W35	MF	0001-0002.218/-
R49	75R	0.25	0W25	MF	0000-7562.538/-
R50	392R	1	0W35	MF	0001-0000.896/-
R51	26k7	1	0W35	MF	0001-0002.519/-
R52	30k1	1	0W35	MF	0001-0002.564/-
R53	301R	0.1	0W25	MF	0000-7576.100/-
R54	75R	0.25	0W25	MF	0000-7562.538/-
R55	2k67	1	0W35	MF	0001-0001.578/-
R56	26k7	1	0W35	MF	0001-0002.519/-
R57	30k1	1	0W35	MF	0001-0002.564/-
R58	301R	0.1	0W25	MF	0000-7576.100/-
R59	75R	0.25	0W25	MF	0000-7562.538/-
R60	2k67	1	0W35	MF	0001-0001.578/-
R61	6k81	1	0W35	MF	0001-0001.976/-
R62	6k81	1	0W35	MF	0001-0001.976/-
R63	4R7	5	0W25	MF	0001-0006.609/-
R69	69R8	0.25	1W	MF	0000-7603.125/-
R70	1k21	1	0W35	MF	0001-0001.277/-
R71	5R11	0.5	0W25	MF	0000-7547.294/-
R72	5R11	0.5	0W25	MF	0000-7547.294/-
R73	5R11	0.5	0W25	MF	0000-7547.294/-
R74	5R11	0.5	0W25	MF	0000-7547.294/-
R75	5R11	0.5	0W25	MF	0000-7547.294/-
R76	5R11	0.5	0W25	MF	0000-7547.294/-
R77	5R11	0.5	0W25	MF	0000-7547.294/-
R78	5R11	0.5	0W25	MF	0000-7547.294/-
R79	5R11	0.5	0W25	MF	0000-7547.294/-
R80	5R11	0.5	0W25	MF	0000-7547.294/-
R81	5R11	0.5	0W25	MF	0000-7547.294/-
R82	5R11	0.5	0W25	MF	0000-7547.294/-
R83	5R11	0.5	0W25	MF	0000-7547.294/-
R84	5R11	0.5	0W25	MF	0000-7547.294/-
R85	5R11	0.5	0W25	MF	0000-7547.294/-
R86	10k	1	0W35	MF	0001-0002.137/-
R87	332k	1	0W35	MF	0001-0003.291/-
R88	100k	1	0W35	MF	0001-0002.991/-
R89	10k	1	0W35	MF	0001-0002.137/-
R90	100k	1	0W35	MF	0001-0002.991/-
R91	10k	1	0W35	MF	0001-0002.137/-
R92	100k	1	0W35	MF	0001-0002.991/-
R93	8k25	1	0W35	MF	0001-0002.056/-
R94	1k5	1	0W35	MF	0001-0001.358/-
R95	75R	1	0W35	MF	0001-0000.456/-
R96	39k2	1	0W35	MF	0001-0002.658/-
RV1	2k	20	0W5	Var.	0000-7603.167/-
C1	22n	20	40V	Cer.	0001-0006.418/-
C2	10µ	10	63V	Al. Ox.	0001-0041.693/-
C3	330n	10	100V	PF.	0001-0010.420/-
C4	22n	20	40V	Cer.	0001-0006.418/-
C5	3µ3	10	100V	PF.	0001-0010.572/-
C6	18p	2	63V	Cer.	0001-0004.258/-
C7	8p2	0.25	63V	Cer.	0001-0004.148/-
C8	100n	10	100V	PF.	0001-0010.365/-
C9	47µ	20	6V3	Tant.	0001-0041.059/-
C10	47µ	20	6V3	Tant.	0001-0041.059/-
C11	100µ	20	10V	Tant.	0001-0041.156/-
C12	3n9	10	63V	Cer.	0001-0004.782/-
C13	470µ	10	16V	Al. Ox.	0001-0041.910/-
C14	1500µ	10	10V	Al. Ox.	0000-7599.815/-
C15	1500µ	10	10V	Al. Ox.	0000-7599.815/-
C16	100n	10	100V	PF.	0001-0010.365/-
C17	39p	2	63V	Cer.	0001-0004.371/-
C18	39p	2	63V	Cer.	0001-0004.371/-
C19	100n	10	100V	PF.	0001-0010.365/-
C20	150p	2	63V	Cer.	0001-0004.575/-
C21	150p	2	63V	Cer.	0001-0004.575/-
C22	68µ	20	16V	Tant.	0001-0041.114/-
C23	1µ	10	100	PF.	0001-0010.501/-
C24	22µ	20	16	Tant.	0001-0040.966/-
C25	39p	2	63	Cer.	0001-0004.371/-
TR1				BC107	0000-7603.549/-
TR2				BC107	0000-7603.549/-
TR3				MJE 2955	0001-0068.236/-
TR4				2N2369A	0000-7542.066/-
TR5				2N3231	0001-0017.342/-
TR6				2N2219A	0000-7601.486/-
TR7				2N2905A	0001-0017.287/-
TR8				2N2905A	0001-0017.287/-
TR9				MJE 3055	0001-0017.148/-
TR10				VN 10 KM	0000-7591.224/-
TR11				2N2369A	0000-7542.066/-
TR12				BC109	0000-7602.126/-
TR13				BC109	0000-7602.126/-
TR14				BC109	0000-7602.126/-

ASSEMBLY P.C.B. A133 OUTPUT AMPLIFIER (continued)

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
TR15				BC109	0000-7602.126/-
D1				1N4448	0001-0018.493/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
D4				1N4448	0001-0018.493/-
D5				1N4448	0001-0018.493/-
D6				1N4448	0001-0018.493/-
D7				1N4448	0001-0018.493/-
D8				1N4448	0001-0018.493/-
D9				1N4448	0001-0018.493/-
D10				1N4448	0001-0018.493/-
D11				1N4448	0001-0018.493/-
D12				1N4448	0001-0018.493/-
D13				1N4448	0001-0018.493/-
D14				1N4448	0001-0018.493/-
D15				1N4448	0001-0018.493/-
VC1	2 - 18p		300V		0000-7598.463/-
IC1				LM 324N	0000-7578.085/-
IC2				4070B	0001-0071.029/-
L1	1µ8, Var.			INDUCTOR	4501-1401.006/4
L2	3µ3			INDUCTOR	4501-1402.005/4
L3	Anti-Parasitic Bead			INDUCTOR	0001-0044.629/-
RL1				RSD - 12V	0001-0069.620/-
RL2				RSD - 12V	0001-0069.620/-
RL3				RSD - 12V	0001-0069.620/-
RL4				RSD - 12V	0001-0069.620/-
RL5				RSD - 12V	0001-0069.620/-
RL6				RSD - 12V	0001-0069.620/-
RL7				RSD - 12V	0001-0069.620/-
RL8				RSD - 12V	0001-0069.620/-
RL9				RSD - 12V	0001-0069.620/-
PL1				SUBMINAX	0000-2682.002/5
PL2				6-WAY	0000-7603.691/-
PL3				6-WAY	0000-7603.691/-
SKT1				D.I.L. 14 WAY	0000-7518.388/-
A133				P.C.B. OUTPUT AMPLIFIER	4501-0133.003/2

OUTPUT TRANSFORMER

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
OUTPUT TRANSFORMER					
T1				TRANSFORMER OUTPUT	4501-1301.009/4

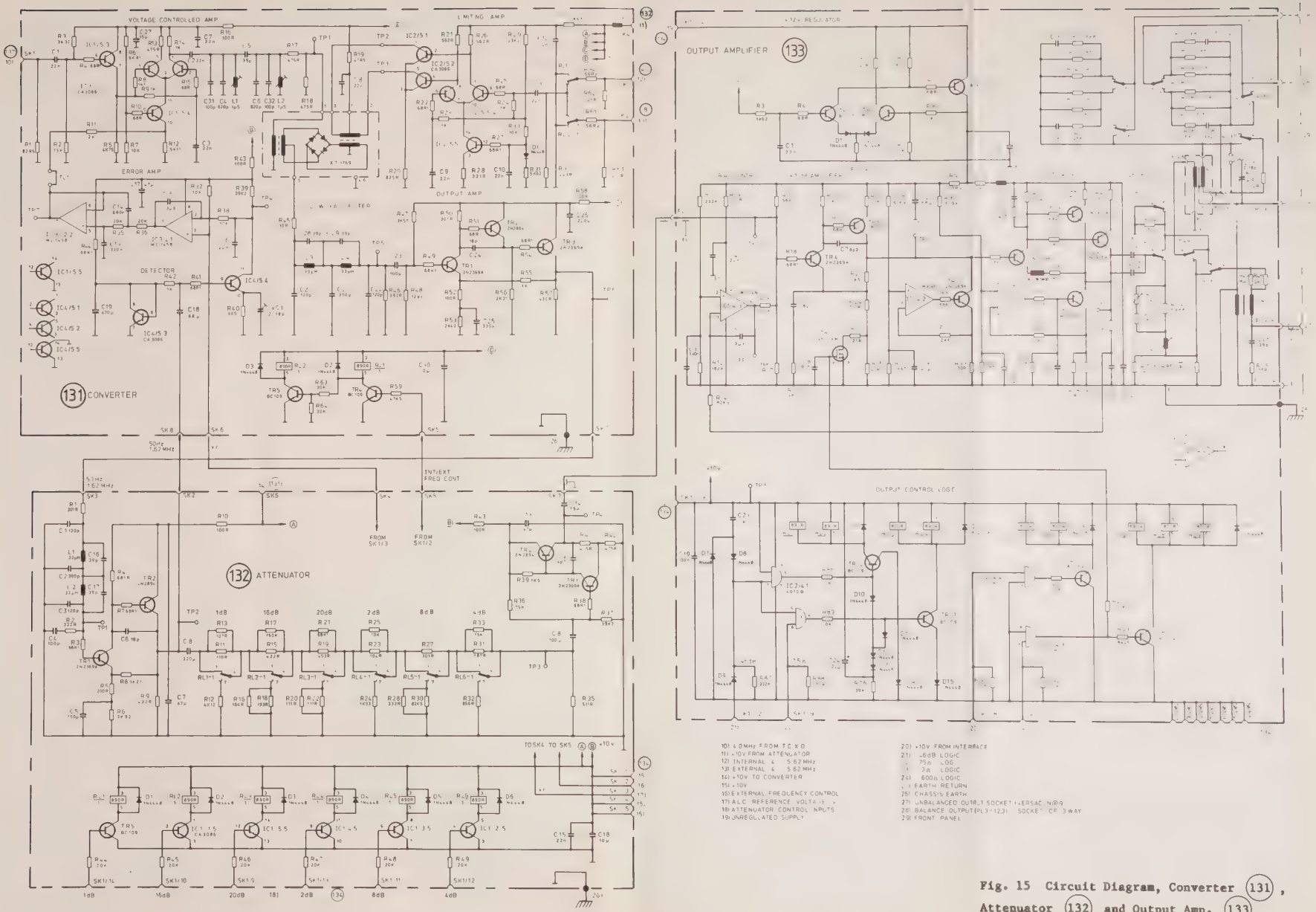
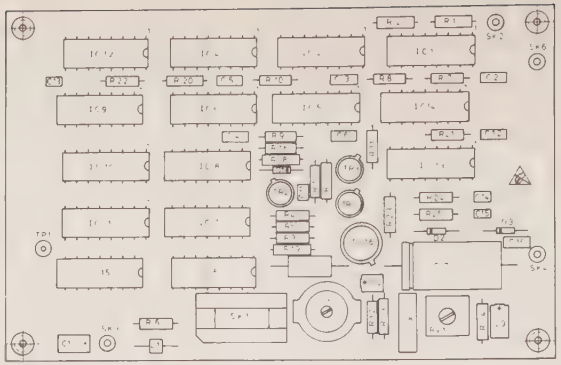


Fig. 15 Circuit Diagram, Converter (131), Attenuator (132) and Output Amp. (133)

ASSEMBLY P.C.B. A33 DIVIDER 1

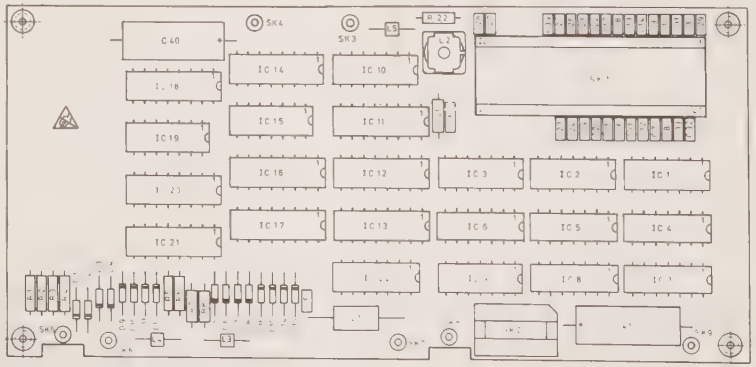
REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	29k8	0.5	0W125	MF	0000-7599.174/-
R2	60k4	0.5	0W125	MF	0000-7598.243/-
R3	120k	0.5	0W125	MF	0000-7598.256/-
R4	243k	0.5	0W125	MF	0000-7598.269/-
R5	301k	0.5	0W125	MF	0000-7598.272/-
R6	612k	0.5	0W125	MF	0000-7600.474/-
R7	1M2	5	0W35	CF	0001-0007.297/-
R8	2M4	5	0W35	CF	0000-7601.376/-
R21	10k	1	0W35	MF	0001-0002.137/-
R22	5R62	1	0W35	MF	0001-0003.945/-
C5	470p	10	63	Cer.	0001-0004.669/-
C6	22p	2	63	Cer.	0001-0004.290/-
C7	1n	10	63	Cer.	0001-0004.698/-
C8	1n	10	63	Cer.	0001-0004.698/-
C9	1n	10	63	Cer.	0001-0004.698/-
C10	1n	10	63	Cer.	0001-0004.698/-
C11	1n	10	63	Cer.	0001-0004.698/-
C12	1n	10	63	Cer.	0001-0004.698/-
C13	1n	10	63	Cer.	0001-0004.698/-
C14	1n	10	63	Cer.	0001-0004.698/-
C15	1n	10	63	Cer.	0001-0004.698/-
C16	1n	10	63	Cer.	0001-0004.698/-
C17	1n	10	63	Cer.	0001-0004.698/-
C18	1n	10	63	Cer.	0001-0004.698/-
C19	1n	10	63	Cer.	0001-0004.698/-
C20	1n	10	63	Cer.	0001-0004.698/-
C21	1n	10	63	Cer.	0001-0004.698/-
C22	1n	10	63	Cer.	0001-0004.698/-
C23	1n	10	63	Cer.	0001-0004.698/-
C24	1n	10	63	Cer.	0001-0004.698/-
C25	1n	10	63	Cer.	0001-0004.698/-
C26	1n	10	63	Cer.	0001-0004.698/-
C27	1n	10	63	Cer.	0001-0004.698/-
C28	1n	10	63	Cer.	0001-0004.698/-
C29	1n	10	63	Cer.	0001-0004.698/-
C30	1n	10	63	Cer.	0001-0004.698/-
C31	1n	10	63	Cer.	0001-0004.698/-
C32	1n	10	63	Cer.	0001-0004.698/-
C33	1n	10	63	Cer.	0001-0004.698/-
C39	1n	10	63	Cer.	0001-0004.698/-
C40	10µ	+50-10	63	Elec.	0001-0041.693/-
C41	10µ	+50-10	63	Elec.	0001-0041.693/-
D1			1N4448		0001-0018.493/-
D2			1N4448		0001-0018.493/-
D3			1N4448		0001-0018.493/-
D4			1N4448		0001-0018.493/-
D5			1N4448		0001-0018.493/-
D6			1N4448		0001-0018.493/-
D7			1N4448		0001-0018.493/-
D8			1N4448		0001-0018.493/-
D9			1N4448		0001-0018.493/-
D10			1N4448		0001-0018.493/-
D11			1N4448		0001-0018.493/-
D12			1N4448		0001-0018.493/-
D13			1N4448		0001-0018.493/-
D14			1N4448		0001-0018.493/-

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
D15				1N4448	0001-0018.493/-
D16				1N4448	0001-0018.493/-
IC1				4011	0001-0015.988/-
IC2				4011	0001-0015.988/-
IC3				4011	0001-0015.988/-
IC4				14023	0001-0016.026/-
IC5				14023	0001-0016.026/-
IC6				14023	0001-0016.026/-
IC7				14082	0001-0070.868/-
IC8				14082	0001-0070.868/-
IC9				4012	0001-0065.475/-
IC10				4073	0001-0070.871/-
IC11				4027	0001-0016.042/-
IC12				4160	0000-7529.351/-
IC13				4049	0001-0068.197/-
IC14				4027	0001-0016.042/-
IC15				4011	0001-0015.988/-
IC16				4160	0000-7529.351/-
IC17				4160	0000-7529.351/-
IC18				4027	0001-0016.042/-
IC19				4011	0001-0015.988/-
IC20				4160	0000-7529.351/-
IC21				4160	0000-7529.351/-
IC22				14023	0001-0016.026/-
L1				INDUCTOR	0001-0042.757/-
L2				INDUCTOR	4502-1423.003/4
L3				FERRITE BEAD	0000-7567.737/-
L4				FERRITE BEAD	0000-7567.737/-
L5				FERRITE BEAD	0000-7567.737/-
SK1				SOCKET D.I.L. 40-WAY	
				J23 - 8040	0000-7541.711/-
SK2				SOCKET D.I.L. 14-WAY	0000-7518.388/-
A33				P.C.B. DIVIDER 1	4502-0133.006/2



COMPONENT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER eg R21 BECOMES R3421
C4 BECOMES C3404

Fig. 16 Component Layout, Divider 2 (34)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER
eg R7 BECOMES R3307
C30 BECOMES C3330

Fig. 17 Component Layout, Divider 1 (33)

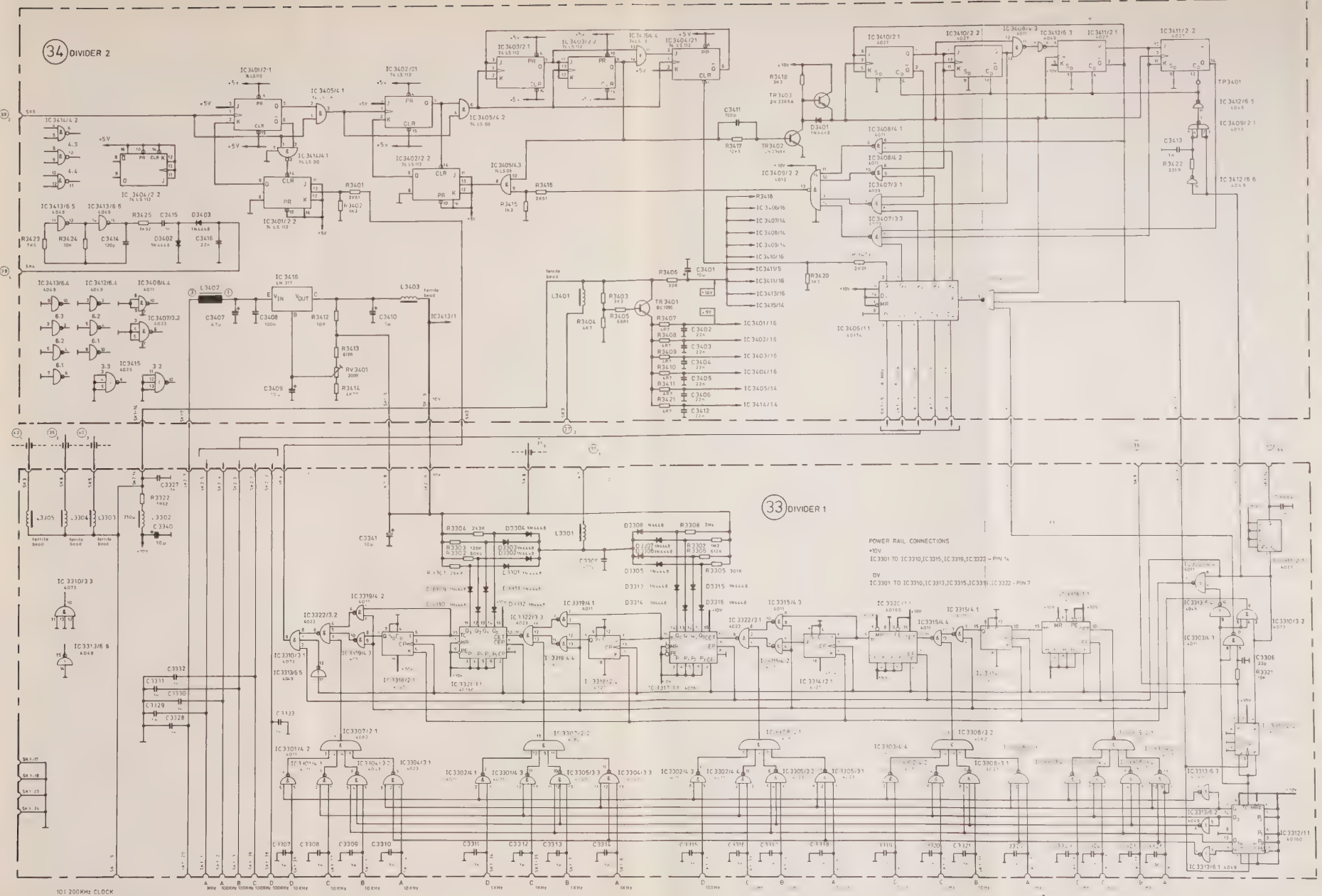

34 DIVIDER 2
33 DIVIDER 1
POWER RAIL CONNECTIONS
+10V
IC 3301 TO IC 3310, IC 3315, IC 3319, IC 3322 – PIN 14
0V
IC 3301 TO IC 3310, IC 3313, IC 3315, IC 3319, IC 3322 – PIN 7
101 200KHz CLOCK
111 SUB HARMONIC DETECTION PULSE
121 PHASE COMPENSATION CURRENT
131 PHASE MEASURING TIME
141 DATA CHANGE

Fig. 18
Circuit Diagram, Dividers 1 (33) & 2 (34)

ASSEMBLY P.C.B. A34 DIVIDER 2

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	2k61	1	0W35	MF	0001-0001.565/-
R2	1k3	1	0W35	MF	0001-0001.303/-
R3	3k3	2	0W25	MF	4980-0000.012/-
R4	4k7	2	0W25	MF	0001-0001.811/-
R5	68R1	2	0W25	MF	0001-0000.427/-
R6	33R	2	0W25	MF	0000-7601.347/-
R7	4R7	5	0W25	MF	0001-0006.609/-
R8	4R7	5	0W25	MF	0001-0006.609/-
R9	4R7	5	0W25	MF	0001-0006.609/-
R10	4R7	5	0W25	MF	0001-0006.609/-
R11	4R7	5	0W25	MF	0001-0006.609/-
R12	10R	1	0W35	MF	0001-0000.074/-
R13	619R	0.5	0W125	MF	0000-7512.245/-
R14	4k75	0.5	0W125	MF	0000-7535.251/-
R15	1k3	1	0W35	MF	0001-0001.303/-
R16	2k61	1	0W35	MF	0001-0001.565/-
R17	12k1	1	0W35	MF	0001-0002.218/-
R18	3k3	2	0W25	MF	4980-0000.012/-
R19	2k61	1	0W35	MF	0001-0001.565/-
R20	1k3	1	0W35	MF	0001-0001.303/-
R21	4R7	5	0W25	MF	0001-0006.609/-
R22	221R	1	0W35	MF	0001-0000.715/-
R23	7k5	1	0W35	MF	0001-0002.014/-
R24	10k	1	0W35	MF	0001-0002.137/-
R25	3k92	1	0W35	MF	0001-0001.730/-
C1	10µ	20	25	Tant.	0001-0040.885/-
C2	22n	20	100	Cer.	0001-0006.418/-
C3	22n	20	100	Cer.	0001-0006.418/-
C4	22n	20	100	Cer.	0001-0006.418/-
C5	22n	20	100	Cer.	0001-0006.418/-
C6	22n	20	100	Cer.	0001-0006.418/-
C7	47µ	+50-10%	40	Tant.	0001-0041.758/-
C8	100n	10	100	PE	0001-0010.365/-
C9	10µ	20	25	Tant.	0001-0040.885/-
C10	1µ	20	35	Tant.	0001-0040.704/-
C11	150p	2	63	Cer.	0001-0004.575/-
C12	22n	20	100		0001-0006.418/-
C13	1n	20	100		0001-0004.698/-
C14	120p	2	63	Cer.	0001-0004.562/-
C15	1n	20	100		0001-0004.698/-
C16	22n	20	100	Cer.	0001-0006.418/-
TR1				BC109 C	0000-7602.126/-
TR2				2N2369A	0000-7542.066/-
TR3				2N2369A	0000-7542.066/-
D1				1N4448	0001-0018.493/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
RV1	200R	20	0w5	Var.	0000-7601.622/-
IC1				74 LS 112	0001-0071.427/-
IC2				74 LS 112	0001-0071.427/-
IC3				74 LS 112	0001-0071.427/-
IC4				74 LS 112	0001-0071.427/-
IC5				74 LS 08	0001-0067.169/-
IC6				40174	0000-7565.399/-
IC7				4023	0001-0016.026/-
IC8				4011	0001-0015.988/-
IC9				4012	0001-0065.475/-
IC10				4027	0001-0016.042/-
IC11				4027	0001-0016.042/-
IC12				4047	0001-0068.197/-
IC13				4049	0001-0068.197/-
IC14				74 LS 00	0001-0065.695/-
IC15				4025	0001-0065.488/-
IC16				LM 317	0000-7596.724/-
L1				B62110	0000-7567.737/-
L2				INDUCTOR	4502-1429.007/4
L3				B82114	0001-0042.757/-
SK1				SOCKET D.I.L. 14-WAY	
				J23 - 2028Z	0000-7518.388/-
A34				P.C.B. DIVIDER 2	4502-0134.005/2

ASSEMBLY P.C.B. A35 PHASE DETECTOR

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	8k25	1	0W35	MF	0001-0002.056/-
R2	5k23	1	0W35	MF	0001-0001.866/-
R3	7k15	1	0W35	MF	0001-0001.992/-
R4	909R	0.5	0W125	MF	0000-7509.685/-
R5	68R1	1	0W35	MF	0001-0000.427/-
R6	27k4	1	0W35	MF	0001-0002.522/-
R7	6k19	1	0W35	MF	0001-0001.934/-
R8	25k5	0.5	0W125	MF	0000-7599.682/-
R9	20k	1	0W35	MF	0001-0002.409/-
R10	200K	0.5	0W125	MF	0000-7591.428/-
R11	562k	0.5	0W125	MF	0000-7598.298/-
R12	196k	0.5	0W125	MF	0000-7598.308/-
R13	16k5	1	0W35	MF	0001-0002.328/-
R14	7k15	1	0W35	MF	0001-0001.992/-
R15	226R	0.5	0W125	MF	0000-7515.174/-
R16	68R1	1	0W35	MF	0001-0000.427/-
R17	3k83	1	0W35	MF	0001-0001.727/-
R18	7k32	1	0W35	MF	0001-0002.001/-
R19	6k34	0.5	0W125	MF	0000-7512.339/-
R20	105k	0.5	0W125	MF	0000-7598.285/-
R21	26k7	0.5	0W125	MF	0000-7528.747/-
R22	54k9	1	0W35	MF	0001-0002.784/-
R23	86k6	1	0W35	MF	0001-0002.959/-
R24	1k5	1	0W35	MF	0001-0001.358/-
R25	68R1	1	0W35	MF	0001-0000.427/-
R26	26k7	1	0W35	MF	0001-0002.519/-
R27	7k15	1	0W35	MF	0001-0001.992/-
R28	16k5	1	0W35	MF	0001-0002.328/-
R29	1k33	1	0W35	MF	0001-0001.316/-
R30	909R	1	0W35	MF	0001-0001.183/-
R31	68R1	1	0W35	MF	0001-0000.427/-
R32	270k	2	0W25	MF	0000-7601.363/-
R33	348k	1	0W35	MF	0001-0003.314/-
R34	100R	1	0W35	MF	0001-0000.537/-
R35	402k	1	0W35	MF	0001-0063.121/-
R36	84k5	1	0W35	MF	0001-0002.946/-
R37	196k	1	0W35	MF	0001-0002.946/-
R38	59k	1	0W35	MF	0001-0002.810/-
R40	3k01	1	0W35	MF	0001-0001.620/-
R41	35k7	1	0W35	MF	0001-0002.616/-
R42	1M2	5	0W25	CF	0001-0007.297/-
R43	100R	1	0W35	MF	0001-0000.537/-
R45	2k7	2	0W25	MF	0000-7558.380/-
R46	287R	1	0W35	MF	0001-0000.786/-
R47	22k1	1	0W35	MF	0001-0002.441/-
R48	3k01	1	0W35	MF	0001-0001.620/-
R49	4k02	1	0W35	MF	0001-0001.743/-
R50	1k5	1	0W35	MF	0001-0001.358/-
R51	4k02	1	0W35	MF	0001-0001.743/-
R52	475R	1	0W35	MF	0001-0000.964/-
R53	68R1	1	0W35	MF	0001-0000.427/-
R54	200R	1	0W35	MF	0001-0000.676/-
R55	68R1	1	0W35	MF	0001-0000.427/-
R56	475R	1	0W35	MF	0001-0000.964/-
R57	3M3	5	0W25	CF	0001-0007.330/-
R58	100R	1	0W35	MF	0001-0000.537/-
R59	7k5	1	0W35	MF	0001-0002.014/-
R60	301R	1	0W35	MF	0001-0000.799/-
R61	47R	2	0W25	MF	0000-7601.321/-
R62	3M3	5	0W25	CF	[illegible]
R63	10M	5	0W33	CF	0001-0005.707/-
R64	4M7	5	0W33	CF	0001-0005.671/-
R65	665k	1	0W35	MF	0000-7518.948/-
R66	3k3	2	0W25	MF	4980-0000.012/-
R67	1M8	5	0W25	CF	0001-0007.310/-
R81	10k	1	0W35	MF	0001-0002.137/-
R82	1M2	5	0W25	CF	0001-0007.297/-
R83	100k	1	0W35	MF	0001-0002.991/-
C1	33p	2	63	Cer.	0001-0004.342/-
C2	22n	20	100	Cer.	0001-0006.418/-
C3	100n	10	100	PE	0001-0010.365/-
C4	10p	2	63	Cer.	0001-0004.177/-
C5	22n	20	100	Cer.	0001-0006.418/-
C6	22n	20	100	Cer.	0001-0006.418/-
C7	10p	2	63	Cer.	0001-0004.177/-
C8	10µ	2	40		0000-7603.418/-
C9	330n	10	100	PE	0001-0010.420/-
C10	220n	10	100	PE	0001-0010.404/-
C11	4µ7	20	10	Tant.	0001-0040.801/-
C13	1n5	10	63	Cer.	0001-0004.711/-
C14	22n	10	100	PE	0001-0010.255/-
C15	100p	2	63	Cer.	0001-0004.517/-
C16	330n	10	100	PE	0001-0010.420/-
C17	1µ0	20	35	Tant.	0001-0040.704/-
C18	33p	2	63	Cer.	0001-0004.342/-
C19	1µ0	10	100		0001-0010.093/-
C20	22n	20	100	Cer.	0001-0006.418/-

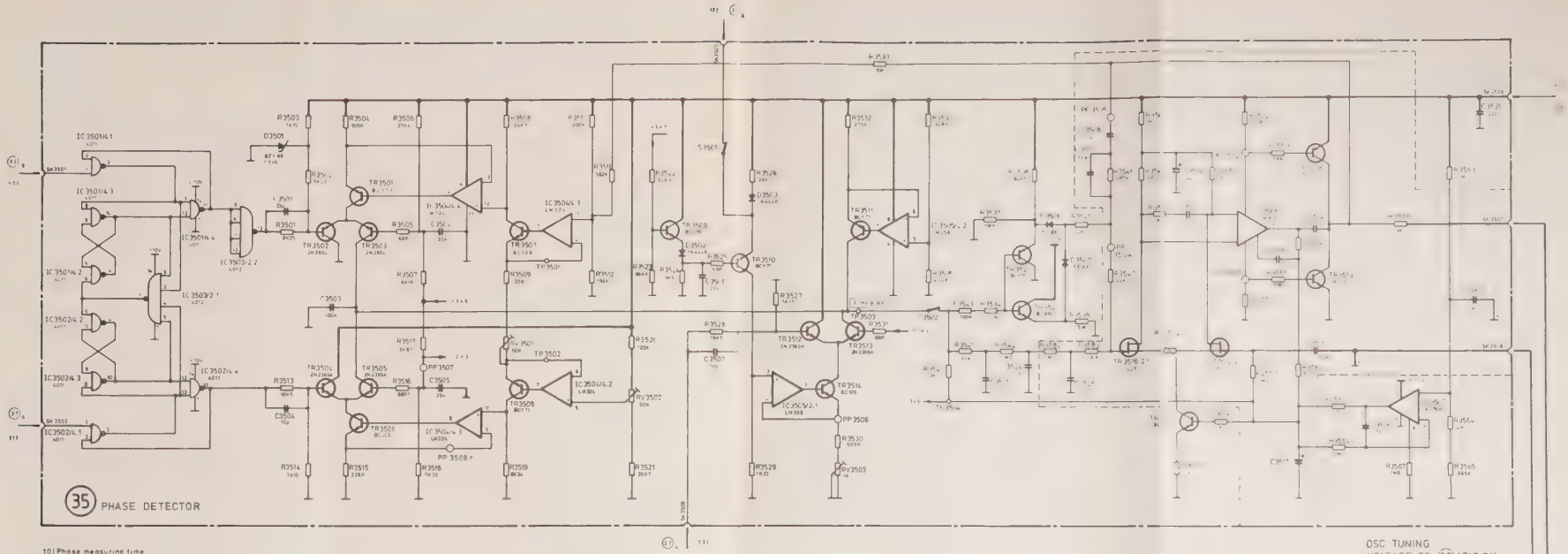
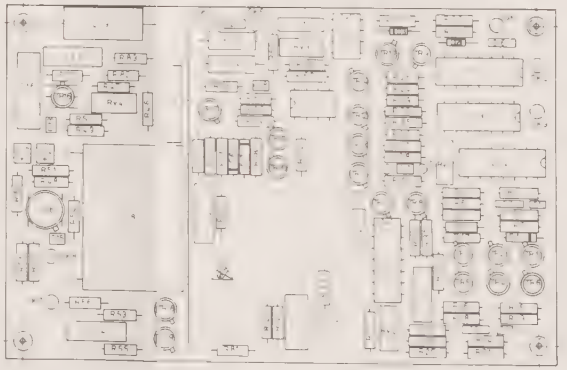

35 PHASE DETECTOR
10) Phase measuring time
11) 10kHz ref
12) Compensation current
13) Phase compensation time
OSC TUNING VOLTAGE TO (36) (FIG. 21)

Fig. 19
Circuit Diagram, Phase Detector (35)

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
C24	10n	10	100	PE	0001-0010.213/-
C25	22n	20	100	PE	0001-0010.255/-
TR1				BCY71	0001-0016.534/-
TR2				2N2894	0001-0016.929/-
TR3				2N2894	0001-0016.929/-
TR4				2N2369A	0000-7542.066/-
TR5				2N2369A	0000-7542.066/-
TR6				BC109	0000-7602.029/-
TR7				BC109	0000-7602.029/-
TR8				BCY71	0001-0016.534/-
TR9				BC109	0000-7602.029/-
TR10				BCY71	0001-0016.534/-
TR11				BCY71	0001-0016.534/-
TR12				2N2369A	0000-7542.066/-
TR13				2N2369A	0000-7542.066/-
TR14				BC109	0000-7602.029/-
TR16				U405	0000-7567.863/-
TR17				BC109	0000-7602.029/-
TR18				BCY71	0001-0016.534/-
TR19				BC109	0000-7602.029/-
TR20				BCY71	0001-0016.534/-
TR21				BC109	0000-7602.029/-

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
D1				BZY 88C5V6	0001-0018.859/-
D2				1N4448	0001-0018.493/-
D3				1N4448	0001-0018.493/-
D6				FDH 300	0001-0018.192/-
D7				FDH 300	0001-0018.192/-
RV1	10k	10 LIN	0W2	Var.	0000-7537.929/-
RV2	50k	20 LIN	0W2	Var.	0000-7571.752/-
RV3	1k	20 LIN	0W2	Var.	0000-7571.723/-
RV4	200R	10 LIN	0W2	Var.	0000-7571.710/-
IC1				4011	0001-0015.988/-
IC2				4011	0001-0015.988/-
IC3				4012	0001-0065.475/-
IC4				LM 324	0000-7578.085/-
IC5				LM 358	0000-7581.140/-
IC6				LM 308 A	0000-7537.071/-
IC7				µA 776 HC	0000-7604.425/-
S1				09100003	0000-7569.999/-
S2				09100003	0000-7569.999/-
A35				P.C.B. PHASE DETECTOR	4502-0135.004/2



COMPONENT REFERENCES TO BE PRECEDED BY BOARD ASSEMBLY NUMBER eg TR14 BECOMES TR3514
D7 BECOMES D3507

Fig. 20
Component Layout, Phase Detector (35)

ASSEMBLY P.C.B. A36 4 - 5.62MHz V.C.O.

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	1k8	2	0W25	MF	0001-0015.510/-
R2	221k	1	0W35	MF	0001-0003.217/-
R3	221k	1	0W35	MF	0001-0003.217/-
R4	100R	1	0W35	MF	0001-0000.537/-
R5	4k7	2	0W25	MF	0001-0001.811/-
R6	68R1	1	0W35	MF	0001-0000.427/-
R7	100R	1	0W35	MF	0001-0000.537/-
R8	10k	1	0W35	MF	0001-0002.137/-
R9	100R	1	0W35	MF	0001-0000.537/-
R10	47k	2	0W25	MF	0000-7558.393/-
R11	39k2	1	0W35	MF	0001-0002.658/-
R12	1k	1	0W35	MF	0001-0001.219/-
R13	33k	2	0W25	MF	4980-0000.009/-
R14	470R	2	0W25	MF	0000-7560.608/-
R15	4k7	2	0W25	MF	0001-0001.811/-
R16	4R7	5	0W25	MF	0001-0006.609/-
R17	1k21	1	0W35	MF	0001-0001.277/-
R18	100R	1	0W35	MF	0001-0000.537/-
C1	100n	10	100	PE	0001-0010.365/-
C2	100n	10	100	PE	0001-0010.365/-
C4	2µ2	5	63		0000-7605.699/-
C5	6µ8	20	6.3	Tant.	0001-0040.830/-
C6	10n	20	40	Cer.	0001-0004.818/-
C7	10n	20	40	Cer.	0001-0004.818/-
C8	100n	10	100	PE	0001-0010.365/-
C9	10n	20	40	Cer.	0001-0004.818/-
C10	1n	20	63	Cer.	0001-0004.698/-
C11	22µ	20	16	Tant.	0001-0040.966/-
C12	100n	10	100	PE	0001-0010.365/-
C13	10µ	20	16	Al.Ox.	0000-7602.773/-
TR1				BF 245 A	0001-0016.628/-
TR2				BF 245 A	0001-0016.628/-
TR3				BF 245 A	0001-0016.628/-
TR4				BC109	0000-7602.029/-
TR5				2N3947	0001-0056.824/-
TR6				BC109	0000-7602.029/-
D1				BB113	0001-0063.943/-
D2				BB113	0001-0063.943/-
D3				1N5711	0001-0018.228/-
D4				1N5711	0001-0018.228/-
RV1	50k	20	0W5		0000-7601.635/-
RV2	1M	20	0W5		0000-7601.619/-
L1	6µH			L24/4502/D	4502-1424.002/4
L2				L26/L27/4502/D	4502-1426.000/4
L3				L26/L27/4502/D	4502-1426.000/4
L4	100µH			210/16471	0000-7556.298/-
L5	200µH			L25/4502/D	4502-1425.001/4
A36				P.C.B. 4-5.62MHz V.C.O	4502-0136.003/3

ASSEMBLY P.C.B. A39 BUFFER

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	68R1	1	0W35	MF	0001-0000.427/-
R2	22k1	1	0W35	MF	0001-0002.441/-
R3	68R1	1	0W35	MF	0001-0000.427/-
R4	27k	2	0W25	MF	0000-7558.377/-
R5	68R1	1	0W35	MF	0001-0000.427/-
R6	5k62	1	0W35	MF	0001-0001.895/-
R7	5k62	1	0W35	MF	0001-0001.895/-
R8	68R1	1	0W35	MF	0001-0000.427/-
R9	1k	1	0W35	MF	0001-0001.219/-
R10	18k	2	0W25	MF	0001-0027.484/-
R11	18k	2	0W25	MF	0001-0027.484/-
R12	6k81	1	0W35	MF	0001-0001.976/-
R13	2k21	1	0W35	MF	0001-0001.497/-
R14	27R	2	0W25	MF	0001-0065.200/-
R15	1k8	2	0W25	MF	0001-0014.510/-
R16	18k	2	0W25	MF	0001-0027.484/-
R17	18k	2	0W25	MF	0001-0027.484/-
R18	100k	2	0W25	MF	0001-0002.991/-
C1	4µ7	20	10	Tant.	0001-0040.801/-
C2	22n	20	40	Cer.	0001-0006.418/-
C3	1n	20	100	Cer.	0001-0004.698/-
C4	10n	20	100	Cer.	0001-0004.818/-
C5	10n	20	100	Cer.	0001-0004.818/-
C6	1n	20	100	Cer.	0001-0004.698/-
TR1				2N2369A MF	0000-7542.066/-
TR2				2N2894	0001-0016.929/-
TR3				2N2894	0001-0016.929/-
TR4				2N2894	0001-0016.929/-
TR5				2N2369A	0000-7542.066/-
A39				P.C.B. BUFFER	4502-0139.003/3

ASSEMBLY P.C.B. A40 SYNTHESISER AMPLIFIER

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	5k62	1	0W35	MF	0001-0001.895/-
R2	24k9	1	0W35	MF	0001-0002.483/-
R3	68R1	1	0W35	MF	0001-0000.427/-
R4	3k3	2	0W25	MF	4980-0000.012/-
R5	1k21	1	0W35	MF	0001-0001.277/-
R6	1k65	1	0W35	MF	0001-0059.232/-
R7	51R1	1	0W35	MF	0001-0065.284/-
R8	75R	1	0W35	MF	0001-0000.456/-
R9	237R	1	0W35	MF	0001-0003.754/-
R10	68R1	1	0W35	MF	0001-0000.427/-
R11	21k	1	0W35	MF	0001-0002.425/-
R12	76k8	1	0W35	MF	0001-0002.917/-
R13	68R1	1	0W35	MF	0001-0000.427/-
R14	68R1	1	0W35	MF	0001-0000.427/-
R15	8k25	1	0W35	CF	0000-7518.854/-
R16	68R1	1	0W35	MF	0001-0000.427/-
C1	1n	20	100	Cer.	0001-0004.698/-
C2	100n	10	100	PE	0001-0010.365/-
C3	10n	2	100	Cer.	0001-0004.818/-
C4	4µ7	20	10	Tant.	0001-0040.801/-
C5	10µ	+50-10	63	Elect.	0001-0041.693/-
C6	22n	20	40	Cer.	0001-0006.418/-
TR1				2N2369A	0000-7542.066/-
TR2				2N3251	0001-0017.342/-
TR3				2N2369A	0000-7542.066/-
TR4				2N3251	0001-0017.342/-
TR5				BC109	0000-7602.029/-
TR6				BC109	0000-7602.029/-
L1	590uH			L28/4502/D	4502-1428.008/4
A40				P.C.B. SYNTHESISER AMPLIFIER	4502-0140.002/3

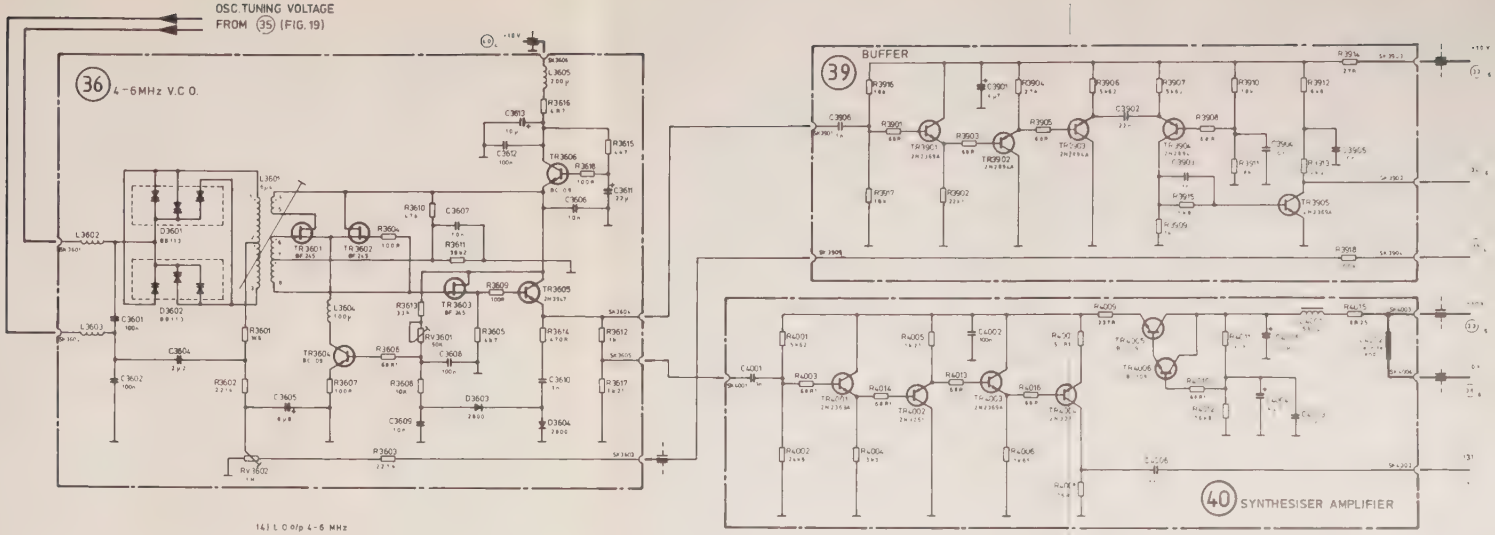
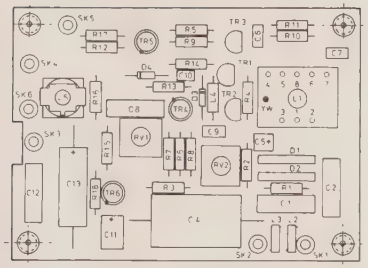
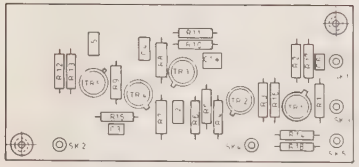


Fig. 21
Circuit Diagram, 4...5.62MHz V.C.O. (36), Buffer (39), Synth. Amp. (40)



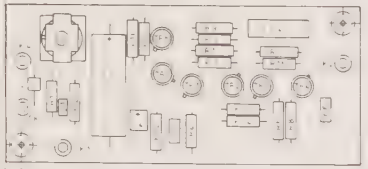
CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBERS
eg R15 BECOMES R3615
C9 BECOMES C3609

Fig. 22 Component Layout, 4...5.62MHz V.C.O. (36)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBERS
eg R11 BECOMES R3911
C1 BECOMES C3901

Fig. 23 Component Layout, Buffer Amplifier (39)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBERS
eg R15 BECOMES R4015
C5 BECOMES C4005

Fig. 24 Component Layout, Synthesiser Amplifier (40)

ASSEMBLY P.C.B. A137 T.C.X.O.

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	75R	1	0W35	MF	0001-0000.456/-
R2	4k75	1	0W35	MF	0001-0001.824/-
R3	30k1	1	0W35	MF	0001-0002.564/-
R4	30k1	1	0W35	MF	0001-0002.564/-
R5	475k	1	0W35	MF	0001-0003.343/-
R6	475k	1	0W35	MF	0001-0003.343/-
R7	1M	1	0W35	MF	0001-0027.507/-
R8	100k	1	0W35	MF	0001-0002.991/-
R9	100k	1	0W35	MF	0001-0002.991/-
R10	475k	1	0W35	MF	0001-0003.343/-
R11	3M3	5	0W25	MF	0001-0007.336/-
R13	5k62	1	0W35	MF	0001-0001.895/-
R14	267R	1	0W35	MF	0001-0003.576/-
R15	267R	1	0W35	MF	0001-0003.576/-
R16	33R2	1	0W35	MF	0001-0000.265/-
C1	1n	10	63V	Cer.	0001-0004.698/-
C2	22n	20	40V	Cer.	0001-0006.418/-
C3	22n	20	40V	Cer.	0001-0006.418/-
C4	150n	10	100V	PF.	0000-7535.154/-
C5	10n	20	40V	Cer.	0001-0004.818/-
C6	1n	10	63V	Cer.	0001-0004.698/-
C8	10n	20	40V	Cer.	0001-0004.818/-
C11	120p	2	63V	Cer.	0001-0004.562/-
C12	22µ	20	16V	Taut.	0001-0040.966/-
C13	22µ	20	16V	Tant.	0001-0040.966/-
C14	22µ	20	16V	Tant.	0001-0040.966/-
TR1				BCY71	0001-0016.534/-
D1				1N4448	0001-0018.493/-
D2				1N4448	0001-0018.493/-
D3				ZTE 1.5	0001-0064.159/-
RV1	1M	20			0000-7603.170/-
IC1				LF 357 N	0000-7606.546/-
IC2				4013	0001-0015.991/-
IC3				4077	0001-0070.897/-
IC4				4077	0001-0070.897/-
IC5				4024	0001-0016.039/-
L1				INDUCTOR	4502-1431.008/4
X1	8MHz			CRYSTAL	0000-7603.523/-
A137				P.C.B. T.C.X.O.	4501-0137.009/2

ASSEMBLY P.C.B. A37 DIVIDER 3

REF.	VALUE	TOL. ± %	RATING	TYPE	PART NO.
R1	18k	2	0W25	MF	0001-0027.484/-
R2	18k	2	0W25	MF	0001-0027.484/-
R3	68R1	1	0W35	MF	0001-0000.427/-
R4	5k62	1	0W35	MF	0001-0001.895/-
R5	5k62	1	0W35	MF	0001-0001.895/-
R6	681R	1	0W35	MF	0001-0001.086/-
R7	68R1	1	0W35	MF	0001-0000.427/-
R8	18k	2	0W25	MF	0001-0027.484/-
R9	18k	2	0W25	MF	0001-0027.484/-
R10	1k8	2	0W25	MF	0001-0014.510/-
R11	22k1	1	0W35	MF	0001-0002.441/-
R12	15R	1	0W35	MF	0001-0014.879/-
C1	22n	20	40	Cer.	0001-0006.418/-
C2	1n	10	63	Cer.	0001-0004.698/-
C3	10n	20	40	Cer.	0001-0004.818/-
C4	33µ	20	6.3	Tant.	0001-0040.995/-
TR1				2N3251	0001-0017.342/-
TR2				2N3251	0001-0017.342/-
TR3				2N2369A	0000-7542.066/-
IC1				4518	0001-0016.178/-
IC2				40175	0000-7529.416/-
IC3				4011	0001-0015.988/-
L1				INDUCTOR	0000-7567.737/-
L2				INDUCTOR	4502-1430.009/4
A37				P.C.B. DIVIDER 3	4502-0137.002/3

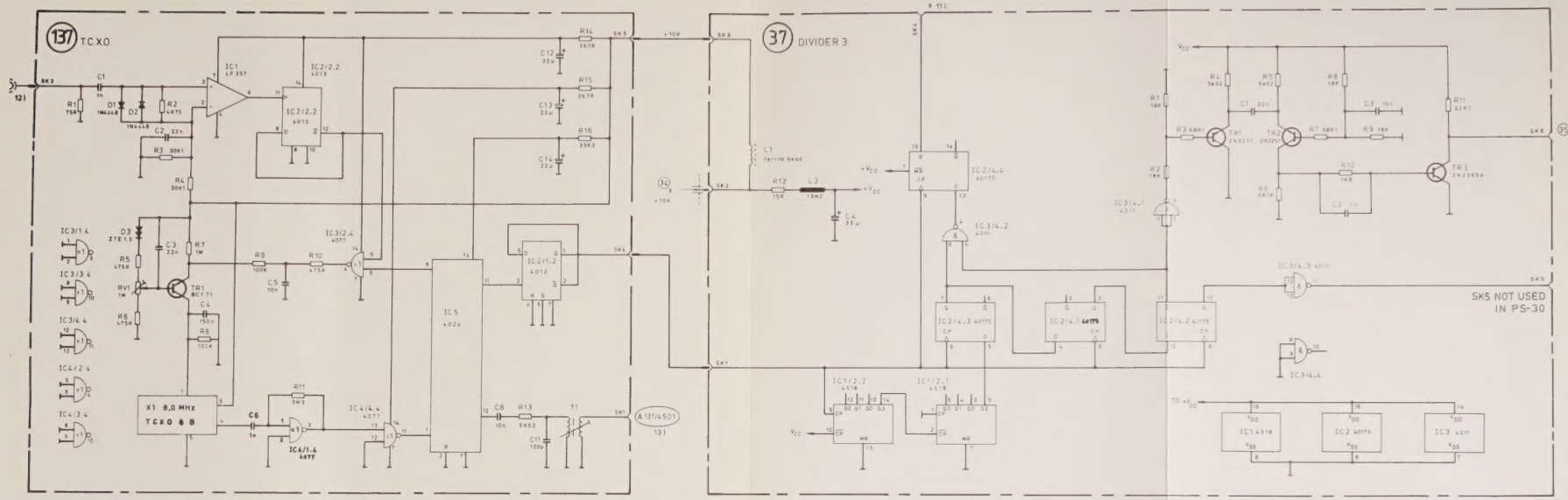
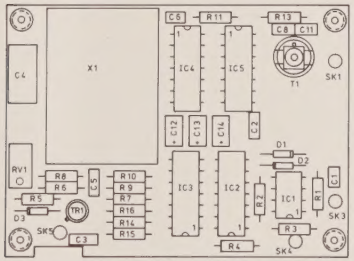
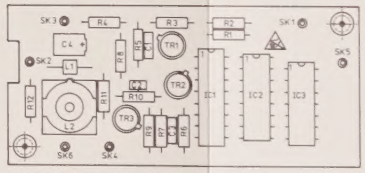


Fig. 25 Circuit Diagram, T.C.X.O. (137) and Divider 3 (37)



CIRCUIT REFERENCES TO BE PRECEDED
BY BOARD ASSEMBLY NUMBER e.g.
IC1 BECOMES IC13701
R15 BECOMES R13715

Fig. 26 Component Layout, T.C.X.O. (137)



CIRCUIT REFERENCES TO BE PRECEDED BY BOARD ASSEMBLY
NUMBER eg IC1 BECOMES IC3701 R10 BECOMES R3710.

Fig. 27 Component Layout, Divider 3 (37)

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